AMERICAN FORESTS

SEPTEMBER 1939

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AMERICAN FORESTS

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The American Forestry Association is a citizens' organization for the advancement of intelligent management and use of the country's forests and related resources of soil, water, wildlife and outdoor recreation.

Its educational activities, of which publication of AMERICAN FORESTS is one, seek to bring about a better appreciation and handling of these resources, whether publicly or privately owned, in order that they may contribute permanently and in the highest degree to the welfare of the nation and its people.

In addition to publication of two magazines — AMERICAN FORESTS and CONSERVATION, both designed to keep before the people of the country important conservation questions and issues, the Association carries on educational projects in various fields including forest fire prevention, reforestation, protection and propagation of fish and wildlife, upstream flood control, prevention of soil erosion, preservation of wilderness areas, establishment of national forests and parks, development of forestry by private endeavor and the teaching of conservation in the schools of the country.

The Association is independent. It has no connection with any federal or state governments. It is non-political and non-commercial. All its resources and income are devoted to the advancement of conservation. It has been so operated since its founding in 1875. All citizens interested in conservation are eligible for membership.

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CONTENTS

VOLUME 45 **September, 1939** NUMBER 9

AMERICAN FORESTS

Page

434 READERS' FORUM

437 THE EDITOR'S LOG

439 WILDERNESS RESURGENT
By Charles Robert Ross

442 PRIMITIVE FORESTS—THEIR GEOLOGIC RECORD
By Allan F. Matthews

446 FILMING THE GOLDEN EAGLE
By Alfred M. Bailey and Robert J. Niedrach

450 FROM LOGGER TO SON
By Newell L. Wright

452 THE TREES OF NEW ENGLAND
Poem by Franklin A. Gaylord

453 CONTROL OF LITTLE WATERS IN NORTH AFRICA
By W. C. Lowdermilk

456 TREE DWELLERS
By L. J. Pessin

458 CONGRESS GETS FOREST RESTORATION PLAN

459 EDITORIALS
A Forest Restoration Plan
Patterns of Conservation

460 TIES FOR THE RAILS OF INDIA
By R. Maclaglan Gorrie

464 FOREST FIRES CLAIM FIVE LIVES

466 FIRE-FIGHTERS AND THE WAGES AND HOURS ACT
By Joseph Rauh

468 FORESTRY IN CONGRESS

470 YOUR SHADE TREES—Tree Expert Or Quack?
By A. Robert Thompson

472 THE CONSERVATION CALENDAR

474 NEW PUBLICATIONS

475 ASK THE FORESTER

480 "WHO'S WHO" AMONG OUR AUTHORS

The Editors are not responsible for loss or injury of manuscripts and photographs while in their possession or in transit. All manuscripts should be accompanied by return postage. The Editors are not responsible for views expressed in signed articles . . . . Notice of change of address for AMERICAN FORESTS should be received by the tenth of the month preceding issue.

Member A. B. C.

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READERS' FORUM

PRESERVING NATURAL BEAUTY

SIR: Your protest against the committee amendments to H.R. 3794, the Gearhart Bill establishing the John Muir-Kings Canyon National Park in California, has my sympathetic interest.

I have been in close touch with Mr. Gearhart regarding his bill and am assured every effort will be made on the floor of the House to restore the name "John Muir" to the bill and to eliminate the construction of dams and reservoirs within the park. Our national parks should not be opened to commercial development as such action would destroy forever the purposes for which they have been created. I was born and reared in the foothills near this region and know the great beauties of the canyon through contact ever since I was a boy and it is my earnest desire to see that this region is preserved in all its natural beauty for posterity.—*Albert E. Carter,* House of Representatives, Washington, D. C.

CHILE'S ALERCE FORESTS

SIR: I am a Frenchman, aged twenty-seven years, and I work for capitalists, of whom another Frenchman directs the interest here in Chile. I have personally explored the entire Cordillera of this region of southern Chile and I have made a report on the immense riches contained in the forests which cover it. There are in these forests (virgin forests) thousands and thousands of alerce trees (*Fitzroya patagonica*), a tree similar, I believe, to the American redwood.

The exploitation of alerce is one of the principal occupations of the inhabitants of this region, who, without any technical skill, cannot derive any profits from this inexhaustible species. There are indeed some exploiters, some sawmills, some buyers, but to the lack of skill of the natives there is added the complete indifferenece of the government and the Chilean capitalists for a region where, to be sure, life is hard and where one enjoys none of the advantages, slight as they may be, of civilization. The result is that there does not exist at present a well-established enterprise, and the experience that I have of this part of Chile makes me sure that a well-equipped enterprise with adequate but not enormous financial backing would quickly yield excellent results, surpassing all expectations.

There are, of course, problems of transportation, of exploitation, of weather-problems which I have studied thoroughly and for each of which there are solutions. Sooner or later the immense Chilean forest will be drawn upon and its woods will be sought by numerous buyers. That day has not yet come, but the riches are there and from now on can largely be developed at a profit.

Alerce grows in the region between Valdiva and Chiloe, i. e., between the 41st and 43rd parallels, generally at fairly high altitudes. According to certain botanists the wood of alerce is probably one of the best in the world, if not *the* best. Alerce is practically exempt from decay and resists any temperature, including great heat and excessive cold as well as sudden changes in extreme temperatures. Its volume never changes in the slightest degree. There are houses built entirely of alerce, more than a century ago, of which the wood is all intact.

Beneath the bark there is a fibrous material, which does not decay in water and which, according to Darwin, is the best calking material in the world, and which is used to calk boats. As for the wood proper, its numerous qualities of lightness, elasticity, sonorousness, and the fact that it does not decay in water or humidity, make it appreciated for the following uses:

Furniture, doors, windows, framing, shingles, cigar boxes, musical instruments. They tell me that Germany has used it in airplane construction. Its impermeability permits its use for water pipes and boat building. There is in Chile a German firm which makes powerful motor boats entirely of alerce as far as the hull, bridge and cabins are concerned, with excellent results. The woodcutters of the region cut out boards a half inch thick which are used for shingles without further preparation. Alerce is not attacked by borers, and is certainly one of the lightest woods of the world. Dry, a board foot weighs hardly two and a quarter pounds.

From all these indications, and from what I know of redwood, it seems that *W.* (*Sequoia*) *gigantea* and *F. patagonica* are practically alike in qualities and uses. —*Pierre Georges Oleon,* Hualaihue por Puerto-Montt, Chile.

ANOTHER REASON FOR FOREST DEPLETION

SIR: I am deeply impressed by the conscience stricken offer of Paul Whiteman to restore through the chief of the Federal Forest Service five young birch trees to replace as many full sized, cut down to supply the 2,000 batons he has used up as conductor of blues, and other music.

If Whiteman alone is thus responsible for such wide destruction of our American birches, what must be the sad toll of our forests due to the bygone disciplinarian attitudes of our fathers, and forefathers, towards their burgeoning disrespectful or disobedient sons? There, too, long before Whiteman was producing music, blues and fortissimo effects, through apt wielding of the birch baton, I feel (or have felt!) sure that my own father alone must have been responsible for several young trees through the period of my earlier home education. Multiply that by several million heroic fathers who once believed in the good of home discipline, (rather than later reformatories and prisons) and you will find, I am confident, still another reason for the disappearance of American forests in the past.

Surely then it was incumbent upon "our old man" in the mass or their benefited sons to voluntarily replant this deforested mileage. But alas, for the most part this is now too late. That spartan and heroic generation has been gathered to their fathers. Our Pater Familiae Americanae are too soft, too indulgent, or too lazy to appreciate the value of good old American birches for filial breeches. Nay, today they allow unstripped forests to grow, too often only to be burned through fires set by their careless, cigarette-sucking sons, who, lacking all wholesome respect for green wood in the individual branch, allow it wantonly to perish in the mass. I fear that the value of our fine old forests in the cause of character building, in the antique manner, has never been adequately appreciated.—*Lee de Forest,* Los Angeles, California.

THE WRONG RANCH

SIR: Sorry—but I think your leading article this month ("I Wanted to Herd Cattle," by Grace Ernestine Ray, August issue) one of the stupidest I've ever read and calculated to do considerable damage to a genuine and dignified business which is one of the major assets of the range country and which, throughout, has been a valiant friend of conservation.

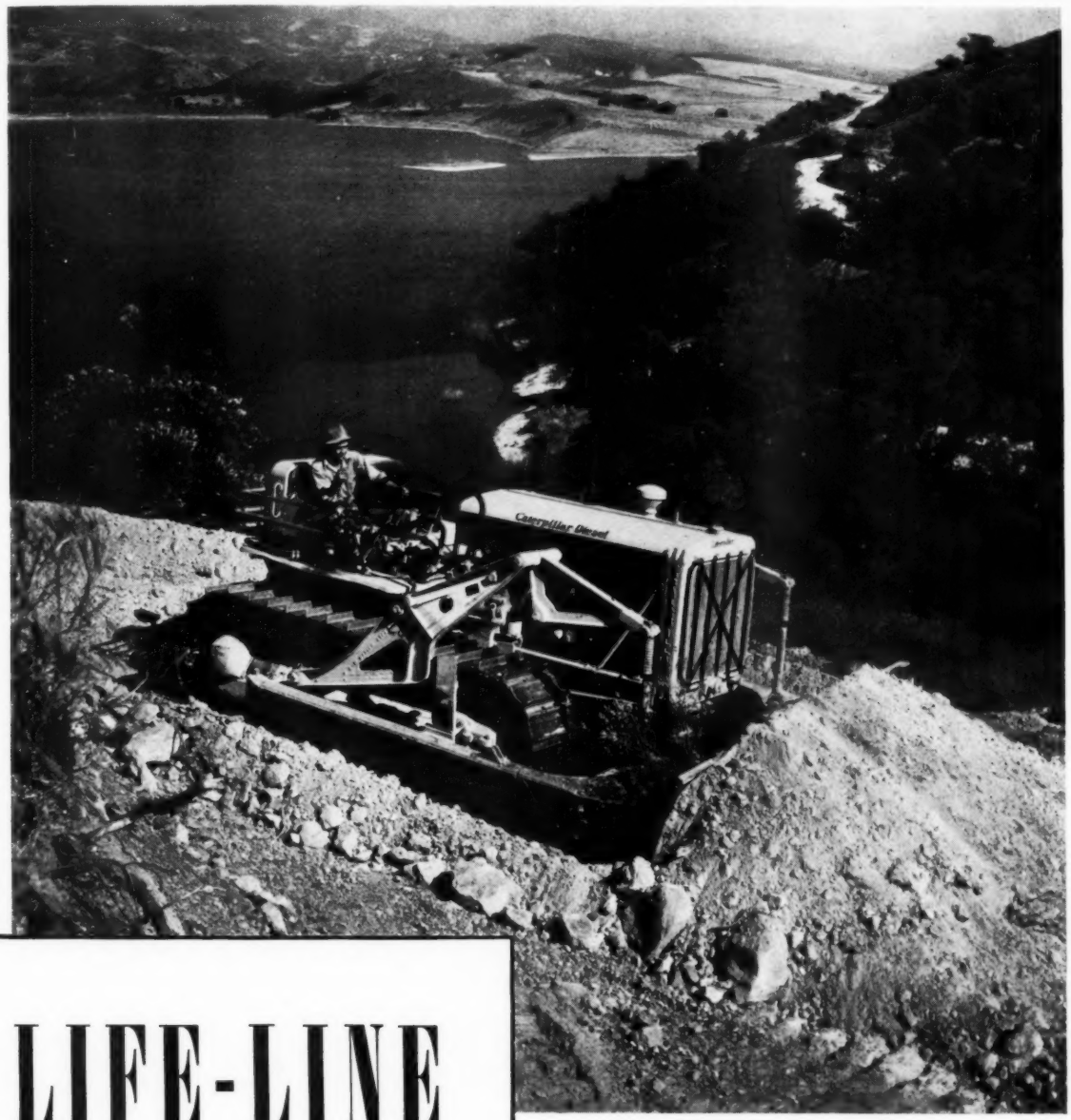
There are dude ranches and dude ranches. The fact that Miss Ray went to one she so wittily calls "the Wahoo" and found no genuine ranch life proves nothing except that Miss Ray went to the wrong ranch.—*Struthers Burt,* Three River Ranch, Jackson Hole, Wyoming.

WHERE EDUCATION IS NEEDED

SIR: I am very much in sympathy with the work of The American Forestry Association. I do feel, however, that it is almost a waste of money to subscribe to such functions when our tobacco companies are doing the advertising that we find in all magazines and papers.

It has been my experience that the average man or woman tosses a cigarette or a lighted match out of the car window without the slightest thought of whether or not it will start a fire.

I have made quite an effort to counteract this carelessness but unless we have the backing of our fire insurance companies and organizations such as your own I doubt if much progress can be made. It seems to me that until this is done, putting money into most any organization is like throwing it into a well.—*F. D. Keim,* Chairman, Department of Agronomy, University of Nebraska, Lincoln, Nebraska.



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■ The By-laws of The American Forestry Association provide for a governing board of "fifteen elected directors" who shall "have the direction and management of the affairs of the Association." This Board of Directors—made up of men known nationally in various educational, industrial and professional fields—serves entirely voluntarily, their only reward lying in service to a public cause of great importance. It is the purpose to introduce them to our members in this and succeeding issues of the magazine, in the order of their terms of service. From this standpoint Henry S. Graves is preeminent, he first having been elected a director in 1901.

Born in Marietta, Ohio, on May 3, 1871 of New Hampshire pioneer stock, and descended on his maternal side from John Alden, he received his A.B. from Yale in 1892, and took postgraduate courses in forestry at Harvard and the University of Munich, in Germany. In 1896-97, he was assistant to Gifford Pinchot, then a consulting forester in New York City. Appointed Assistant Chief of the United States Division of Forestry in 1898, he served until 1900 when he left to become professor and first director of the newly organized Yale Forest School at New Haven. In 1910 he resigned to become Chief Forester of the United States, serving until early in 1920.

In the meantime, the United States had entered the World War. In June 1917, he was sent to France by the War Department to plan for the work of the forest engineers for whom General Pershing had cabled a pressing call to Washington. He arrived in France June 20, 1917 and visited areas of the British and Canadian forestry operations. With the probable requirements of the American Expeditionary Forces before him, he requested that forestry troops be rushed to France with all possible speed so that preparations might be made for the arrival of the combatant army. From that time until the arrival of the 10th Engineers —known as the "Lumberjack" regiment—Lt. Col. Graves was engaged in locating the French timber tracts and negotiating for the purchase of lumber for army operations.

Upon the arrival of the forest engineers — a force ultimately numbering more than 20,000 men,—he returned to the United States in February and resumed his duties as Chief Forester. He resigned in 1920 and returned to Yale to become Dean of the Forest School and in 1923 was made Provost of the University, finally severing his official contact and retiring to private life in 1939.

Col. Graves has made extensive timber surveys of the East, West and South and has presented his findings in technical forestry books, the two best known of which are "Forest Mensuration" and "The Principles of Handling Woodlands." He also has written many government bulletins and more than 150 articles for leading papers and magazines.

Elected a Director first in 1901, he served nine successive one-year terms. In 1922 he was reelected to the Board and has served continuously ever since, during which time he has served three full terms as President of the Association.

THE AMERICAN FORESTRY ASSOCIATION

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THE GOLDEN RULE of forest conservation in the minds of many people is or should be "plant a tree for every tree cut." Those who maintain that lumbermen at last have embraced religion may now point to the fact that a company engaged in large scale lumbering operations has written this rule on the fly leaf of its operating bible. In a recent issue of *The Timberman,* David S. Painter, manager of the lumber division of the Fruit Growers Supply Company of Susanville, California, announced that his company has adopted the policy of a tree for a tree.

"Beginning in the spring of 1940," Mr. Painter says, "we will replant the area we cut in 1939 tree for tree and continue this practice in like manner year after year. This method of reforestation will be more positive than simply leaving seed trees to reforest the cut over areas."

* * * * *

Late in June, Congressman Horton of Wyoming tossed a queer looking missive into the current of national park legislation. It was queer looking because its like has not been seen on Capitol Hill in recent times. The current there has been increasingly dotted with bills—usually tossed in by the National Park Service—to create new parks or to extend existing parks. Mr. Horton, however, shattered the surface of things by introducing a bill to abolish the Grand Teton National Park and to transfer its lands, improvements and facilities to the Teton National Forest from which its 96,000 acres were taken back in 1929.

No one really believes that Mr. Horton seriously expects or wants his bill to be passed. It is interpreted more as a legislative scarecrow to frighten the National Park Service from trying to poach upon more public lands by extending the present boundaries of the Teton Park. This extension the National Park Service has long sought to bring about over the protest of the people of western Wyoming. Year in and year out, it has been studied, investigated, debated. Both sides have their points, but as to the proposition of abolishing the Teton National Park as its boundaries are now drawn, there can be no argument. Just one view across Jackson Lake of the Teton Range is sufficient to convince any one that those massive soul-stirring peaks have rightly found their home.

* * * * *

The morning mail brings this editorial clipped from the August 3 issue of the Harrisburg *Evening News* and sent in by a member in Pennsylvania who writes that he can think of no group of people who will be more appreciative of the thought expressed than members of The American Forestry Association:

"The success of the shelter-belt plan of tree planting in the 'dust bowl' areas is marked enough after five years to justify Secretary Wallace in saying that they may help to make the Great Plains region a breadbasket for the nation rather than an ever threatening desert.

"At four cents apiece, the government has helped plant 127,000,000 trees along 11,000 miles of windbreak. Some of the trees, which vociferous and sarcastic critics insisted wouldn't grow, are now thirty and thirty-five feet high. And on more than 20,000 farms, new life has come to the crops, and new hope to the farmers.

"Without faith, there can be no progress; without the willingness to take a risk there can be no solid gain. The cedars, pines, locusts, Chinese elms, and willows waving in the prairie breeze are a row of banners to a risk justified and a faith vindicated."

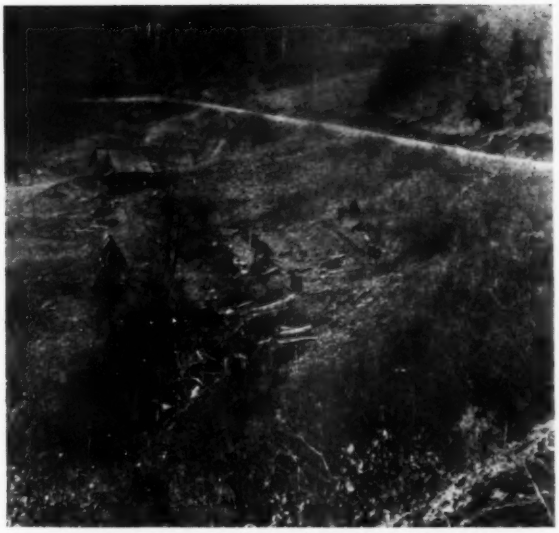
Ovid Butler

Editor.

More than a century ago, settlers invaded the high, rugged backlands of the Southern Appalachians—land with no promise of permanent agriculture—and cleared small farms. The picture below shows a cornfield atop Hawk Mountain, in Georgia, about ten years ago—long since abandoned and reverting again to wilderness conditions

WILDERNESS RESURGENT

By CHARLES ROBERT ROSS



On tilted slopes of the shoulders of the Blue Ridge settlers built homes precarious from the first, and finally surrendered to the ordained wilderness

A FOREST wilderness is on the march in the Southern Appalachians. In a vigorous advance it is reoccupying thousands of acres wrested from it during the last century and a half by intrepid settlers. The movement is unusual. America has always seen man invading and pushing back the wilderness—but here the tables are turned. A resurgent wilderness is sweeping over former human habitations on a far-flung front.

The Southern Appalachians, viewed geologically as very old and weathered down to relative smoothness, include nevertheless much territory that is most forbidding topographically. Massive mountain groups, buttressed by innumerable spurs, form veritable labyrinths of broken and twisted ridge-lands. In the well ordered scheme of nature, such terrain was unmistakably designed to be clothed in forest for all time, uncultivated and uninhabited—a natural, permanent wilderness. The lands of true wilderness character comprise from a fourth to a third of the region.

The eroded mountains of China, the denuded highlands of Scotland, and dozens of waste places over the earth are stark warnings of the ruin that may result from a disregard for nature's plan. The high, rugged back-lands of the Southern Appalachians held no promise for permanent agricultural usage, save the prospect of deterioration. Yet, during the headlong spread of settlement in America they were overrun by settlers. Now the unchanging natural forces have begun to tell; mountaineers have felt the pinch from strained physical resources; they have been surrendering the home sites their forefathers seized. And hard on their heels, the advancing forest has been closing in over the usurped portions of its age-old heritage.

Much of the Southern Appalachian country is amenable to permanent and prosperous agriculture. Toward the end of the eighteenth century pioneers took the broad valleys; came the nineteenth century and with it increasing tides of home-seekers. Accessible smaller valleys were occupied, and, as more people came, foothills and lower slopes were cleared for cultivation and pasturage. Eventually the inhospitable high country—the ordained wilderness—was surrounded by settlement.

The wilderness, triumphant, marches back—young pines leading the forest's advance,—to find one lone defender, an old apple tree, telling of the farm now gone

It might well have been left inviolate, but such was the tenor of the period that frontiers could not become fixed. Tilted slopes and pocketed fastnesses were combed in the search for home sites as settlers stormed the wilderness. The high coves—deep shadowed glens where great trees towered to feel the sunlight — were seized. Summits and high mountain sides were cleared. From cabins perched on the sharp roofs of mountains, ridge-dwellers could look out on a world that rolled downward in great sweeps toward the hazy distance.

How much of the natural wilderness domain was thus possessed? An idea can be gained from consideration of the national forests and parks that now have title to 5,000,000 acres in the region. These

lands are very largely the sort here classed as wilderness. Forest Service land examiners estimate that from ten to fifteen per cent of the national forest area was cleared by settlers. On these government lands alone it would seem that half a million acres were put to raising crops at one time or another in the past. In addition to the areas that were fully cleared the settlers partially cleared a great many more. It was common practice to open up pastures by deadening trees here and there in the woods surrounding tilled fields.

The hewing out of such home sites amounted to a vast area in the aggregate. The great number of abandoned fields and homesteads, "house places" the mountaineers call them, encountered all over the isolated highlands of North Carolina, Virginia, Georgia, and Tennessee can hardly fail to stir reflections on this intensely interesting movement. Crumbling stone chimneys; zigzag lines of mold that mutely tell of rail fences; dense, even-aged stands of young timber delineating patches once cleared —these are vestiges of settlement scattered over the ridges everywhere, and now miles from human habitations. Persons who traverse the infrequented mountains are surprised the first few times they come upon forlorn, struggling apple trees wedged in aggressive young forest growth. The mountain farm always had apple trees.

The fields abandoned earliest—around fifty years ago—now have dense stands of young timber

Why did people choose to live in such places? This query gathers significance when it is recalled that the peak of the Appalachian invasion occurred around 1850, at which time far-spread reaches of fertile lands awaited settlement beyond the Mississippi. The high promise of these western lands was much-discussed at the period, and must have been known to the great numbers of people who elected, notwithstanding, to climb into the mountainous parts of the Southern Appalachian region.

The original settlers were attracted into the wilderness by certain real advantages they believed to be there. And most of all, it seems, they were lured by an almost unbelievable abundance of game. Countless times I have shared with old-time mountaineers the hours they fondly devote to recollections of earlier years, also I have read from the few contemporary records, and it is my experience that little would remain to be told or read if references to hunting were omitted. Wild animals are relatively scarce now in the same territory, but from the lushness and variety of the vegetation it can be understood how immense numbers once found suitable food and cover there. Southern Appalachian forests once teemed with game and settlers had to get nearer the good hunting. They were looking for more than the food and other necessities it could supply. It brought them satisfactions that nothing else could, for love of hunting was in their blood.

Contemporary accounts seem to confirm all that one hears about the abundance of game. The observations of Charles Lanman, a literary traveler who visited this wilderness country about 1840, provide a fascinating picture of its early pioneer scenes. His writings inform us that settlers had even then established homes over the forbidding ranges away from the more accessible valleys. He tells of spending a night in a cabin on the very top of the state-striding Blue Ridge divide.

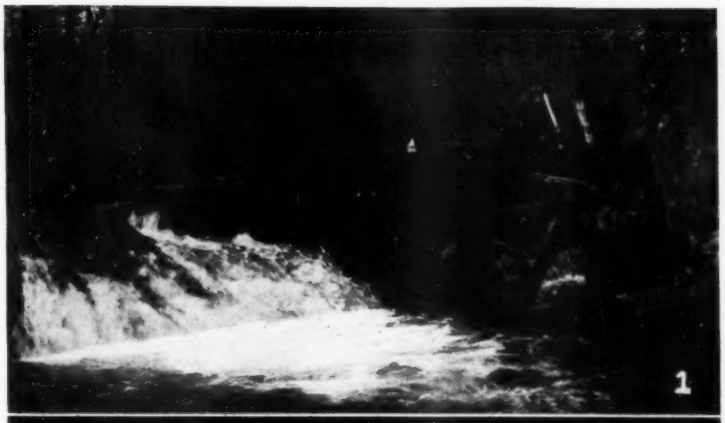
"My host," he relates, "had a family of nine sons and three daughters, not one of whom had ever been out of the wilderness region of Georgia. . . . He told me that the mountains were susceptible of cultivation to their summits, also that the country abounded in game such as deer, turkeys, and bear, and an occasional panther. Some of the mountains, he informed me, were covered with hickory and a peculiar kind of oak (probably Chestnut oak) and that gray squirrels were very abundant. The streams, he also informed me, were well supplied with large minnows, by which I afterward ascertained he meant the brook trout."

Lanman was very greatly impressed throughout his journey northward into western Virginia with the myriad wealth of wildlife. He tells of visiting a certain settler who had a reputation as a hunter. This man hunted and trapped ". . . the bear, the black and gray wolf, the panther, the wildcat, the fox, the coon, and some dozen other varieties." A race of hunters had taken the rugged uplands.

It cannot be supposed, however, that abundant game would have provided a living for these mountaineers. Hunting fired the desire of many persons to push into the wilderness, but alone it could not have made the difference between a sufficient living and a poor one. Another factor must be accorded great importance in the back-mountain scheme of living. The southern mountaineers of the last century mastered a self-sufficient kind of economy that met their essential needs to a degree not lacking in satisfactions and comforts. Practice of this "homemade" economy of self-reliance enabled them to hold their small clearing buried in forests of wild aspect.

I am well acquainted with a sharp old Georgia mountaineer who had always lived in a broad cove that tapers upward to a high gap of the Blue Ridge. His father and his grandfather lived there before him. Like all of the old-timers, he will tell you that the mountain people used to live pretty well—a lot (*Continuing on page* 476)

1—Remains of the foundations of a settler's grist mill whose chutes and turbines were hewn from the great trees of the original forest



2—A chestnut rail fence—fallen evidence of the former settler's field,—now abandoned to the wilderness

3-4—The hill folk are full of fine characteristics—self dependence, quiet strength, simple faith and resourcefulness — qualities old age but enhances

A restoration of a Carboniferous landscape, showing primitive and coal plant forms. From "Erdgeschiste" by Neumayr

PRIMITIVE FORESTS -- THEIR GEOLOGIC RECORD

By ALLAN F. MATTHEWS

TIME was when our great American forests were far more extensive than they are today. But there was also a time—a long, long time—when no forest, no tree, not even a blade of grass clothed the naked continents of the world.

This state of affairs, as might be supposed, existed in the earlier stages of earth history. Geologists and astronomers believe that the earth was flung from its fiery parent, the sun, some two billion years ago, an age not readily comprehendible. Almost seventy-five per cent of this endless stretch of time elapsed before any form of life at all was clearly written in the geologic record. Rocks of this age, however, especially the younger ones, show some evidence of the microscopic thallophytes and lowly organisms that were existent in those ancient seas.

On land was only barrenness throughout this one and a half billion years. There was not the feeblest trace of life in guise of animal or plant. Huge mountain ranges

Restored primitive tree growth, behind setting of rocks, is shown in this Gilboa Devonian Forest of New York, reproduced by courtesy of the New York State Museum. This is the oldest known fossil forest

were buckled up and then eroded away by tiny raindrops, assisted only by the destructive agents of time. The monotonous rockscape cradled rivers and suffered storms, but not a leaf was tossed nor a sound heard, for even the crudest of shoots and ears were yet to appear.

This first seventy-five per cent of earth history was composed of several geologic periods, but the plant and animal record of these earlier periods was so imperfectly written in the sedimentary rocks or has lost so much of their early identity, that these periods are all grouped together in sort of a chronological wastebasket and labelled the pre-Cambrian.

These were followed by the Cambrian period of intermittent inundation of some ninety million years, the Ordovician of seventy million, and then the Silurian of twenty-five million, adding another ten per cent to the age of the earth. By this time, still 300 million years before the dawn of man, every single phylum of the animal kingdom had become established, though the existing representatives were all aquatic, primitive, and comparatively small. The plant kingdom did not fare quite so well. The algae, bacteria, and seaweeds of pre-Cambrian times made little progress in the three long periods that followed, though it may have been in the last of these periods that primitive plants first encroached upon the land, as indicated by fossils found in recent years. At any rate, the stage was set for the appearance of the great forests of the future.

Evidence of the oldest known petrified forest, like many another paleontological find, was discovered quite by accident. It all started some seventy years ago, toward the close of 1869, when an unusually heavy storm swept down on the Catskill Mountains of eastern New York. Torrents of rain sluiced into the mountain creeks, dislodged boulders from rocky ledges, and raced them in muddy leaps down to the gentler valleys below. Soon after the skies had cleared, many of these creek beds were found to be quite thoroughly washed out. The Schoharie Creek onslaught exposed in the bed rock, near the little village of Gilboa, a number of standing stumps of fossil trees.

This discovery was soon brought to the attention of the scientific world. The great interest aroused was primarily due to the fact that never before had rocks so old been found to be host to huge trees, which in this instance were seed-fern trees. Of Devonian age, said the geologists, having observed that the commoner fossils as well as the relative rock position duplicated the Devonian period type section in Devonshire, England. By this they meant roughly 280,000,000 B. C.,—long ago when the more radical members of the animal kingdom were first leaving a watery habitat and learning to gulp the air of their new land environment.

In the decades that followed the first discovery at Gilboa, many more fossil stumps were unearthed. The specimens remained *in situ* down through the ages, their roots still embedded in the now hardened mud where they grew, and their protruding stumps surrounded by the wave-borne sands that choked their life from them when the site was a seashore, and subsequently protected them from decay as the land slowly emerged to its present mountainous heights. Many of the stumps were recovered during quarrying there in the construction of a water-supply reservoir for New York City. This reservoir was to submerge the renowned Gilboa fossil site, but not before enough specimens were found in the vicinity to show that here stood a real forest—the most primitive one that man has ever known.

Fortunately, not only petrified tree stumps and roots were found, but also trunks, bits of foliage, and even seeds. These gave studious paleobotanists a rather clear picture of these most ancient of trees. Their general appearance was that of the tree ferns of the tropics today. They stood some thirty-five feet high and bore

© Field Museum of Natural History

A beautiful restoration of the Pennsylvanian Forest. The Carboniferous period was probably a very long one. The coal-age forests were much grander than their Gilboa predecessors. Many of the plants attained great size and from them the coal was formed

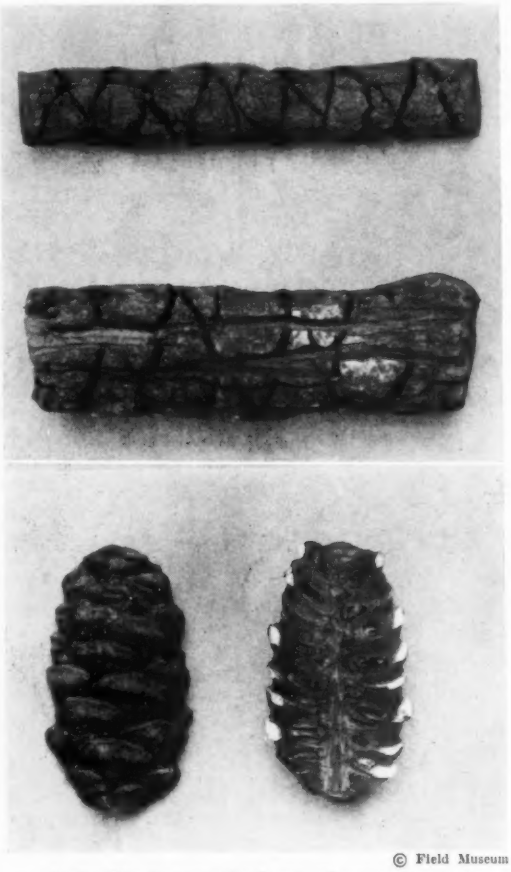
seed-tipped fronds six to nine feet long. As the skillful restoration in the New York State Museum shows, the pinnules or leaflets were not very numerous, hence the primitive forest was probably but sparsely shaded.

The classification of these trees was somewhat of a puzzle for a time. They were first referred to *Psaronius,* a genus of true ferns, but with the discovery of their seed-bearing characteristics, they were relegated to a newly-coined genus, *Eospermatopteris,* meaning "dawn of the seed fern." This group was found to include at least two distinct species, *E. textilis,* a type whose trunk was characterized by a network of interlacing strands of strengthening tissue, and *E. erianus,* whose trunk was fluted with more or less parallel strands. Thus botanical nomenclature was forced to expand and create a new niche just for the ancient Gilboa trees, but such recognition is little enough credit for the oldest of fossil forests, for truly this was the forest primeval.

As all things must, the first of forests had their heyday and vanished. But the climatic severity which pointed the way to their disappearance was not to be prolonged. Quite the contrary, for with the dawn of the subsequent age came one of the warmest geologic periods ever known. Extremely mild climatic conditions prevailed all over the world, nurturing coral reefs along the Arctic coast of Spitzbergen and covering the temperate regions with lush tropical forests.

The United States at this time was flat and low. Ancient land masses existing along our present coast-lines slowly contributed untold millions of tons of rock debris inland, building expansive coalescing delta swamps. Here thrived huge forests of fast-growing, soft-tissued trees, which stood for a short time in shallow water and then slowly sank in tangled masses amid the roots of those soon to follow. This incessant growth and submergence, continuing for millions of years, caused the accumulation of hundreds of feet of vegetable matter, protected from decay by the watery blanket overhead.

Like all manner of life, these peaty tree remains were composed essentially of carbon, oxygen, and hydrogen. Pressure and chemical activity drove off the latter two elements as water or gas. The carbon that remained now forms the extensive coal fields of the Appalachian and Central states and the great coal beds of England, France, Germany, and Russia as well.



© Field Museum

In the Triassic came the forests of araucarians and other conifers. These are cones and leaf-scarred proaraucarian branches found in the Cerro Cuadrado fossil forests

Man's persistent mining of this cherished coal has led him to thousands upon thousands of tree fossils. Their quantity and variety are so great that, despite the fact that no whole standing fossil forests have been discovered, a very clear picture may be had of the flora that existed in this aptly-designated Carboniferous period.

Both in extent and height the coal-age forests were much grander than their Gilboa predecessors. And they were just as strange. Most prevalent of the many types were the scale trees, rising to heights of one hundred and thirty-five feet. They looked like modern palms, though with less foliage, and their bark was marked with distinctive leaf scars, either spirally diamond-shaped (*Lepidodendron*) or vertically grooved (*Sigillaria*). Beside them stood the forerunners of the modern conifers (*Cordaites*), lofty and branchless except near the top, where were bunched branches bearing sword-shaped leaves.

Beneath the taller scale trees and cordaites grew various kinds of giant ferns, the only forest life lending a modern aspect to the steaming scene. In some sections of the swamp were stands of hundred-foot high scouring rushes (*Calamites*), bamboo-like in structure and bearing flower-shaped leaf whorls (*Annularia*). And there were many other kinds as well. All bathed in the sunlight of this perpetual summer, absorbed its radiant energy, and conserved it through eons for the advent of man.

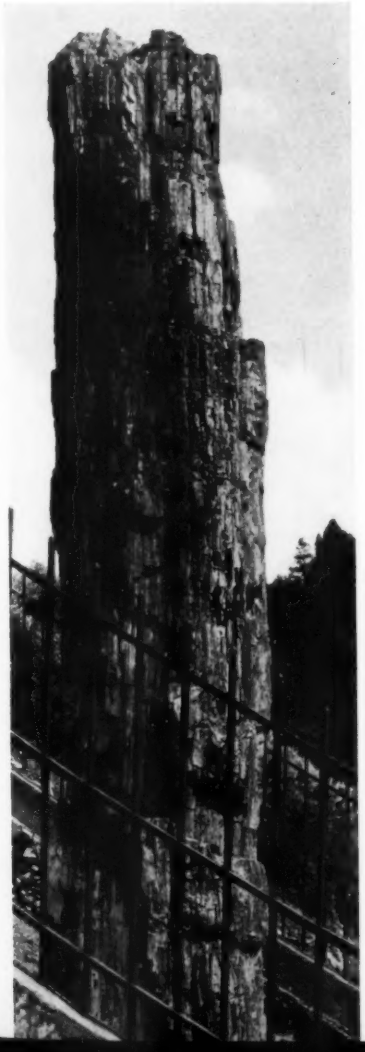
Perhaps the most famous of all fossil forests is the Petrified Forest National Monument in Arizona. Here may be seen countless trunks and detached limbs of prostrate giant conifers scattered profusely over the forty-square-mile reserve though chiefly concentrated in four or five "forest" groups. It is primarily the brilliant and variegated coloration of the agatized logs that attracts the many tourists. Also of great popular interest is the 111-foot log that spans a gulch fifty feet deep and forty-four feet wide. This is perhaps the only natural bridge of such a type in the world.

But the Arizona petrified forest is much more than an attractive spot for sightseers; it has an important scientific story to tell. The bare trunks, stripped clean of branches and roots, and their clustered distribution point to the existence of an ancient log jam. Huge conifers grew in this, the Triassic, period, and some of them, felled by the elements, may have been river-borne to the present monument site, (*Continuing on page* 477)

Courtesy Santa Fe Lines

Huge conifers grew in the Triassic period, many of which are seen today—preserved in great perfection of bark, annual rings and cellular structure, in the Arizona petrified forest

National Park Service



(Left) "The Petrified Tree" in the Yellowstone. While the tallest now standing is only thirty feet high, prostrate trunks indicate many trees in this forest were over one hundred feet

The Tertiary is the age of the Yellowstone petrified forests and the spread of modern mammals. These two petrified trees—two feet in diameter, twenty-five feet high and about twenty feet apart—stand on Specimen Ridge in Yellowstone National Park. And from the Cretaceous period dates the cycad petrified forest of the Black Hills of South Dakota, of which a specimen petrified tree is shown at lower right

FILMING THE GOLDEN EAGLE

By ALFRED M. BAILEY and ROBERT J. NIEDRACH

Photographs by the Authors

THERE have been few pictures, if any, made of the American golden eagle at its nest. We wondered about this until we had trailed these birds of prey hundreds of miles, until we had examined dozens of nests and erected many blinds, until we had attempted under varying conditions to film these wary birds. We have been doing this for more years than we like to remember —yet it was not until last year that we were successful enough to mention.

The chief reason for this scarcity of photographic studies of the golden eagle may be found in their nesting habits—and shyness. Few cameramen delight in hanging over sheer cliffs or perching on brittle limbs in the tops of the yellow pines that are found throughout the bird's range in Colorado. For it is here that the eagle nests. It particularly likes the plains area — not the mountains—of the region; it is primarily a bird of the butte sections of prairies and foothills, and it builds its bulky platforms in secluded niches where they are rarely disturbed by man.

Our first pictures were of the young of a pair we had discovered one January when the thermometer registered sixteen degrees below zero. How well we remember it. The male was standing on his nest far up in a pine, tearing to shreds with his powerful beak a yucca stalk which he held firmly with one great talon. As he stripped off a piece of the plant, he would place it in the cup of the nest. Then while we watched with our glasses, he paused in his work and looked off across the valley, and we saw his larger mate winging swiftly toward him with a small limb of yellow pine in her mandibles. She alighted on the nest, her great wings held poised momentarily, dropped the twig, and then both birds launched into space.

The nest was so high above the surrounding trees that we had no chance, when we returned later, to erect a blind and secure photographs of the adults. Instead we had to be satisfied with sitting on the edge of the nest and interviewing the young. We had anticipated securing action photographs of the adults as they darted at the cameramen—for we had been told that golden eagles were extremely pugnacious. We found, however, that they are very shy and will not come near when their nest is disturbed.

Time has rolled along since our first efforts, and although we have examined various nests, erected blinds, and attempted to obtain pictures, our work, for one reason or another, was more or less futile. Three years ago we had a wonderful set-up. It was along a picturesque bit of escarpment in Weld County, where the wind-sculptured rocks provided ideal pockets for an aerie, with a promontory nearby on which we could build our photographic blind. The eagles had three eggs in their bulky nest and both male and female shared the task of incubation. We visited them often, flushing the incubating bird from the eggs, and although they were wary and quickly disappeared when we arrived on the scene, they always returned after the invasion. Finally downy chicks, no larger than a man's fist, emerged from the eggs. They were white little pirates with hooked rubbery beaks, and so feeble they were able barely to sit erect.

A portable blind was hastily fastened on the ledge, for we know from experience that birds will accept a hiding place at this time if they ever will. It was a warm day and we hoped our baby eagles would not be chilled while the old ones were making up their minds that our canvas shelter was harmless. The nest was visited again toward evening, and from afar, with our field glasses, both birds could be seen upon the ledge. We felt that our efforts to get pictures were to be successful at last.

It was with keen anticipation that we headed across the prairie toward our precipitous hill a week later. But once more our efforts were futile—and our vocabularies too limited to express our feeling toward the individual responsible for the dead adult and two youngsters which were found at the base of the cliff. He must have been an energetic person to take the trouble to tumble our securely fastened blind from its aerial perch.

The following year we had three nests under observation. The big female whose mate had been killed the season before secured a new one—a young bird with a great deal of white on its tail—and they erected a bulky nest against a sheer wall that had few places to which a photographer could cling. However, one of us worked out to the nest and photographed the three eggs. Later in the season another pair with a large youngster was found in a blind canyon, and although we had no difficulty getting to the nest and paying our compliments to the eaglet, we were unable to anchor a blind.

We had one ideal set-up. The young were good-sized downy fellows, probably two weeks old when we found them early in May, and an excellent point projected from the cliff which gave us a perfect photographic perch. It was a cold day and the adult seemed reluctant to leave; it stood on the rim of the nest and watched us as we climbed the cliff. Even after flushing it occasionally sailed overhead, watching us fasten a makeshift hiding place into crevices of the rock.

The following week-end a warm sun bathed the escarpment, and the prairie flowers tried to push their way through the moist soil. Our car slipped and slithered as we drove to the very base of the wall and, as it came to a stop, we saw the adult eagle standing by the large downy youngsters.

Here, at last, we were to get pictures! Our blind was erected, our eagle was on her nest, and she seemed unafraid. With cameras on our backs, and a coil of rope to pull other equipment up the cliff, we started laboriously up the talus slope. A third of the way up we met a rattlesnake that seemed satisfied in the warm sun; he coiled with flat head back, but made no effort to buzz or to escape. We circled him and almost stepped on another. A little later, just short of the cliff, a third struck at one of the passing boots, without the usual courtesy of issuing a warning.

The thought of meeting one of these fellows on the cliff when it is necessary to hold on with both hands occupied our minds for the moment. And well it did, for we were cautious enough to look before grasping the first rock we encountered—and there was a nice greenish fellow, beautifully coiled, his head pulled back and purplish forked tongue working back and forth, waiting quietly.

As it seemed a very poor place to climb the cliff, we detoured a half mile. Even then we encountered a half dozen rattlers. As if this were not enough, the first thing to meet our eyes when we came over the rim of the escarpment were seven rattlesnakes coiled about the base of our blind. Others could be seen in a crevice which extended diagonally downward. On the nesting ledge were several others; in fact, we found rattlers in the most innocent-looking places. Leather boots saved one of us an unpleasant experience when a snake struck without warning. After we counted forty of these reptiles in the vicinity of our nest, we realized the crevice was their denning place and that they were beginning to emerge from their winter's hibernation. Inasmuch as we could not decide who should have the honor of photographing the eagle, we decided that we should both forego the pleasure.

The wind-sculptured rocks provided an ideal aerie, and one of us worked out to this nest and photographed the three eggs

To build a blind of plaster over netting and then pull the bulky affair up the side of the cliff was a difficult job

Our efforts to portray these birds of prey this past spring really started in the fall. Prairie falcons had nested along a picturesque escarpment thirty miles south of Denver, and Niedrach and a companion were collecting mammal bones beneath the old nest sites. While thus engaged they noticed a ledge that seemed ideal as a nesting platform for eagles. Experimenting, they threw an armful of sticks on the outcropping. Two months later eagles were building a nest!

With such cooperation, it was only fair that we should endeavor to make a film story of the home life of these great creatures. The nest, lined with yucca, was completed early in January, and we found two nicely splotched eggs in place on March 7. From then on we visited our eagles two or three times a week, flushing them on each occasion so that they might become accustomed to us. On April 16 the eggs were pipped and we could hear the faint cries of the young. Two days later both had hatched. The adults must have felt their youngsters would have healthy appetites, for they had captured a full-grown jackrabbit and carried it to the nest.

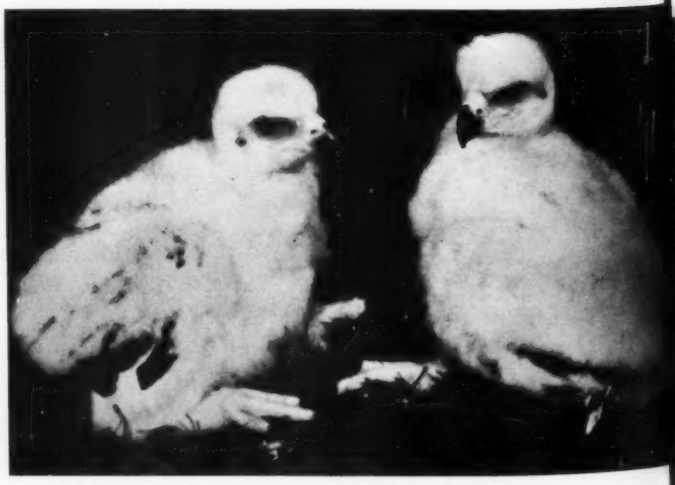
It was a difficult task to build a blind of plaster over netting and pull the bulky affair up the side of the cliff. We accomplished this, however, and when it was anchored it looked not unlike the surrounding rocks. We had an ideal view of the nest—just eighteen feet away.

On April 22, when our young were five days old, we made our first effort to film them. Leaving Denver well before sun up, we found both eagles on the nest; nor did they flush until we stopped our car directly beneath them. A trail which led to the mesa above had long since been located, and we cached ropes nearby, so our photographic equipment could be lowered and the cameraman supported as he climbed down to the blind.

There were no long hours of waiting on this first effort. The automobile scarcely had been driven away when a great-winged bird swooped to the ledge, carrying a spermophile in her talons to add to the plentiful supply already in the larder. But she did not like the whirring of the camera. She gave a startled glance at the blind and sprang into space so hurriedly that she kicked both the jackrabbit and the spermophile off the edge of the nest.

A few minutes later the male, smaller than his mate, came in carrying a bit of yellow pine crosswise in his

The two young—real individuals at the age of three weeks—demand food characteristically



About three weeks old, the feathers begin to darken. And, later, they pose more sedately

beak. Possibly the wheezy cries of the young deadened the whirring of the camera, for he did not seem aware of it for some time; then he, too, launched off the ledge.

The adults were anxious to shelter the young, however, and soon one was seen coming swiftly from the distant canyon wall, flying below the blind, and then swinging upward to the back rim of the nest. The camera was not started until the beautiful creature became interested in feeding the young; then, although she was aware of the noise of the machine, and often gazed at the front of the blind so long that the camera had to be stopped, she did not flush. The roof of the nesting ledge was so low, however, that she would get her head in the shadows in a most irritating way, and although she spent half an hour feeding the fuzzy fellows, the photographic results were discouraging. The mother eagle was very careful in her feeding; tiny bits were stripped from a piece of rabbit in the nest and carefully given the wobbly youngsters.

It was evident that we would have to work on the ledge. The following day, with the aid of block and tackle, hammer and chisel, we pounded away at the flint-like rock. After an hour and a half enough was knocked off the canyon wall so our adult could not hide herself from the camera's eye.

A few days later we tried again for pictures. The young were stronger; they sat up and with rubbery beaks

Niedrach had no difficulty at all in getting into this nest to pay his compliments to the young eaglet

A fine shot of the mother bird and young, at only about five days old

wide open constantly begged food from their absent parents. But we heard no answer from the adults.

Finally, they cruised along the cliff, more wary, it seemed, than on our first effort. Then the female alighted, but flushed a moment later, even though the camera had not been started. In fact, the adults came to the ledge seven times in one hour, but flushed at the slightest sound. At last, the female landed on the front edge of the nest, completely obscuring the young, and complacently fed them without giving the photographer a chance for a single picture of the performance. Three hours in the blind with no worthwhile film!

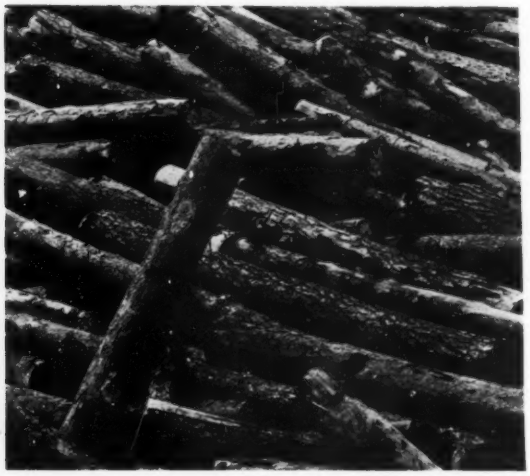
We learn by experience sometimes. With block and tackle we once more visited the eagles' nest, to carry on a few alterations. We wanted our young at the back of the nest, at our left, and we did not want the adult with her back to the camera. The portion of the nest nearest the blind was worked over so that the adult would have a poor landing field, while a good resting place was built at the right and rear of the nest. The young fellows did not resent the intrusion; they sat bolt upright and hissed occasionally, but did not seem to be afraid.

On the last day of April another trip was made to the blind, and after a two-hour wait a bird came in with a bit of yellow (*Continuing on page* 476)

Later, she tears at her prey proudly, as her young eaglet of about sixteen days looks on

FROM LOGGER TO SON

By NEWELL L. WRIGHT



The following is a letter from a logger of the past four decades to his son. The names, of course, are fictitious. The logger has been killed in a speeder wreck and the son has been called in by the directors and offered the job of logging manager. While going through his father's effects, he finds this undelivered letter addressed to him.

"DEAR WILLIAM:

"I have brought you up to be a logger, schooled you in cruising, scaling, railroad location, operation and maintenance, have sent you to college and imparted as best I could my ideas as a heavy log producer. Surprising as it will be to you, I am summarizing what have been as I see them, my most glaring blunders; read them, study them, be not influenced by the training of an orthodox log producer, weigh each question carefully, answer it logically, and judge wisely on what I call 'My Forty Years of Logging Mistakes.' Realizing, as no doubt you do, the apparent success of this company during my forty years of logging supervision, you are probably startled at my admission of serious blundering. The seriousness of my mistakes will be written off in the open-minded decisions you may make as to your future course.

"In '82 this company owned a block of timber on Dixey Ann Bay. A number of settlers had taken up homesteads along the Dixey Ann River, and the company, desirous of expanding their timber resources, hired me to make an examination of the watershed and report on the possibilities of acquiring and logging that timber to Puget Sound. Their logging up to that time had been done with ox teams and horses, but an expansion such as they suggested, which involved the acquiring of a billion feet of old-growth Douglas fir, necessitated to my mind a railroad development. It was fifty miles to the outer limits of this tract, and fifty miles would eventually have to be the length of my mainline.

"The timber was an excellent stand of old-growth yellow fir, the valley was rather wide and the possibility of sewing up more timber (a thing I did not go into at that time), was also quite evident. The topography was such as to simplify the mainline railroad location, but the slopes on each side of the valley, being cut by numerous cross drainages, made the problem of railroading to the stump extremely difficult.

"Much of my actual logging experience up to this time had been gained working with my father in California. He was a natural exponent of ground skidding, with ox teams, was an expert in picking roads and a great judge of timber values. Early, he taught me the application of gravity to log movement, and the necessity of giving every advantage to the power unit, the ox team. He was uncanny in his judgment of the type of timber he could profitably handle, yet determined in his efforts to minimize the damage to other timber not considered loggable.

"Often, I have heard him say, 'It will be valuable some day.'

"He was bitterly opposed to the old spool donkey when it first came out. He could visualize its necessity in pulling logs out of canyons and holes, but thought any logger who tried to do much uphill skidding was facing ruin anyway. Furthermore, he insisted that to handle logs in a straight line (necessary of course with a donkey anchored in one place, as against the ox team which guides the log around stumps and young growth in its downhill progress to the landing) was a ridiculous procedure at best. It would lead to a great deal of destruction to young growth, make a serious fire hazard, and was a waste of actual horsepower which could easily be overcome by the location of favorable grades. I attributed father's arguments largely to prejudice, a reaction the younger generation is quite apt to have. He agreed to the great possibilities of increasing production through the application of power to a cable, but would not agree that greater net profit would result. He knew that machinery ultimately would be the big factor in log production; but clung to the idea of movable equipment of a nature mobile enough to go to a log and drag it out to a

landing; in order that selection could be made of the type of log desirable for the market. His big point was (and I think you will agree) that to mow down a forest, in order to make it possible for a machine to actually remove only the saleable portion, was poor management. Surely it was possible to develop a machine to remove the timber needed and leave the rest to grow.

"How easy it is to follow the crowd! At the time I made my report to the directors of this company after my preliminary examination of the area, a report that was duly acted upon and the timber purchased, I began to investigate the many stories regarding the improvement of donkey engine equipment. I talked with a number of logging superintendents, men who like myself had come up from the ranks, but had drifted somewhat away from the school that dealt with the individual tree to a group of what I might call mass loggers. We seemed to take pride in development of powerful equipment; the type of equipment that would tear a log over and through the non-utilizable smaller growth with uninterrupted speed. No sooner would one operator order donkey equipment built that would meet the demand for reach, speed and power than some other operator would attempt to go just one step farther. No need to delve closer into the history of the development of this type of logging equipment. You compare the first donkey with the massive machine we have at present. You may be surprised when I tell you that I think my biggest logging mistake was my personal support of the development of this equipment. I cannot, I think, be condemned for poor utilization since that factor was far beyond my control, but as a leader in the development of logging methods I cannot condone my part in the destruction of standing timber too small to be merchantable.

"Surely an industry, in which I have exerted considerable leadership, could devise a logging method capable of recognizing and removing the desirable values without complete destruction of an enormous potential resource such as is involved in the pulling over and burning up of trees up to twenty-four inches in diameter and 100 to 150 years old. Think of the value wrapped up in this growing young timber. Think of the value wrapped up in the uncut stands ahead of us in trees that are losing value through natural decay while we, in our effort to cut everything clean, have been retarding their removal (in the process of logging timber that should not at this time go on the market). Think of the large range of values between the twenty-four-inch diameter and the sixty-inch diameter tree. Why should we have left the sixty-inch tree to die when we could have got to it if we had left the twenty-four-inch tree to grow? Yet, William, I not only followed the crowd; at times I led them, and where I led them I am not proud.

"You probably wonder what, under the circumstances, I could have done. I wonder if you realize the high type of civil and mechanical engineering that has gone into the development of the equipment I have described: engineering which should have been diverted toward the development of what might be termed the *movable type* (to replace the ox and the horse). Visualize the skill, daring and untiring effort in the application of present logging methods and consider the same factors directed to methods that would make possible the leaving of those trees that should be saved.

"A lumber salesman once replied to a politician when questioned about the prosperity of lumbering, 'The trouble with the lumber business is that the logger and millman can't produce it as cheap as I can sell it.'

"Think of the planning that could and should have been spent in sustaining, for all time and for posterity, an industry upon which the welfare of the North Pacific slope is so dependent.

"Interlocked more or less with my first real blunder was a second one just as obvious:—my road system. It, to a great degree, imposed great difficulties on individual tree selection and in fact more or less compelled mass log removal. The building of branch railroads, with the restrictions imposed by gradients and curvature, necessitated, of course, the removal of great volumes of timber and wherever the cost of these branch roads was extremely high, the tendency was to enlarge the size of yarding area to the branch railroad. This, as you know, was accomplished by the use of long skylines, slacklines, skidders, etc. These roads were built with the object of removing all the timber within reach at one time. It fulfilled that one purpose; the steel was then removed and the line abandoned. We have over one hundred miles of abandoned spur line on this operation now; the trestles are gone, the road beds practically obliterated. If the same expenditure had been made on the construction of branch highways, think of the great possibilities of selective cutting and recurrent cuts and the permanent value of roads to prosperity.

"Interwoven with and quite dependent upon the logging industry is

Sketch, Courtesy University of Maine

LOGGING WITH OXEN IN 1882

an army of workers whose livelihood has occasioned too little thought. As I look back and review the part I have taken in the permanent welfare of these co-workers, there comes over me again the feeling that I have missed the boat. If you review the past history of this logging operation, you will find it difficult to discover any attempt to encourage home life. In fact this is one of the conditions common to the logging industry and, in but rare cases, especially evident in the West. Our camps have been railroad camps; all movement has been confined to these railroads. Travel, except on company equipment, is not permitted. The building of homes at the camps is discouraged and the married man is practically compelled to live at camp but to maintain his home elsewhere. With the complete removal of the timber and the outlook of a 100-year interval before the possibility of another crop, there is a hesitancy on the part of all the workmen to establish homes. The camps therefore become merely temporary quarters and attract rather migratory workers.

"In dealing with migratory workers we found it was necessary at times to invoke the shut down 'stall.' When men had steady work they often became unreasonable. Ironically we found that a shut down excuse was often advantageous for we found that things ran much more smoothly when men were reasonable and they were generally reasonable when they needed work. I will say in passing, however, that this was not true with the small number of employees who had homes near the works.

"Now there are four perfectly legitimate excuses for shut downs in camps and mills: (1) adverse markets, (2) labor demands, (3) dangerous fire weather, and (4) wintry weather conditions. These are placed in their importance as reasons for shut down and are especially handy when we fear the men will be unreasonable in their wage demands, for of course wage demands often cause shut downs, but we find it much better to shut down first and always use any other more logical reason. If the market is O.K. we can usually run in spite of dangerous fire weather or bad wintry weather, and rather ridiculously we ruin our own markets by filling the water with logs for which there is no demand. So it develops into quite a merry-go-round, and we as big loggers have not contributed much toward the building of permanent settlements.

"I ask you again to picture in your mind the appearance of this great valley as it might have been logged; the home life of the workmen influenced by the free and independent travel over a highway to and from work; the feeling of hope in the future of a life work which is linked with a perpetual growing forest, rich in the values of constant employment, rich in the values of increased yearly growth. Then judge for yourself if our methods are sound.

"I have been the spark plug in the engine of this operation but my current has come from a battery of mass productionists. William, you are dealing in this logging game with a resource capable of better management. I have been working on orthodox lines, supposedly the lines of least mistakes, but what has been gained? A crop has been harvested and a growing crop destroyed. In the process this company—though considered one of the most successful—has, like many others, recovered barely the values wrapped up in the stumpage. Surely a change in method is necessary, and any suggestions of change you make will involve you with the Directors of this company. Their opposition will overcome all your recommendations unless you have adequate data fully tested. Past history as recounted in this letter may be of value. The battle is yours and I do not doubt the outcome. My mistakes are dead but I do not want them buried. In you I hold the hope of their resurrection and final correction. On the day I step out of this job I plan to give this letter to you. As ever,

Your Dad."

THE TREES OF NEW ENGLAND

(Before the hurricane of September 21, 1938)

O trees of New England
With joy do I greet you
The birch tree, the maple,
The elm and the pine;
For deep in my heart
Was the longing to meet you
And find in your presence
A peace half divine.

Far into the forest
Your mysteries lure me
To wonder and awe
And to nameless delight;
A welcome to stillness
You ever assure me
And bid me to wander
Alone, out of sight.

O trees of New England
Serene in your glory
I pause while your stateliness
Speaks to the eye;
I praise you in song
And the marvelous story
Repeat while the forest
Stands listening by.

(After the hurricane)

O trees of New England
In terror I saw you
When groaning you writhed
In the grip of the blast.
And howling and raging
The hurricane smote you
Till prone to the earth
You were ruthlessly cast.

O trees of New England
Profound is my sorrow;
And bowed is my head
As in grief I pass by,
How lordly the branches
To heaven you lifted!
But now you are stripped;
And, all lifeless you lie.

O trees of New England
So battered and beaten,
And cruelly wrenched
From the nourishing earth,
What draft shall my cup
Of its bitterness sweeten
Or what give the forest
A gladsome new birth?

—Franklin A. Gaylord.

BOARD NAMES COMMITTEE ON ELECTIONS

The Board of Directors of The American Forestry Association at its last meeting provided for the Committee on Elections to name candidates for officers of the Association for 1940. The members of the Committee are: John F. Preston, Chairman, Henry E. Clepper, and John W. Watzek, Jr.

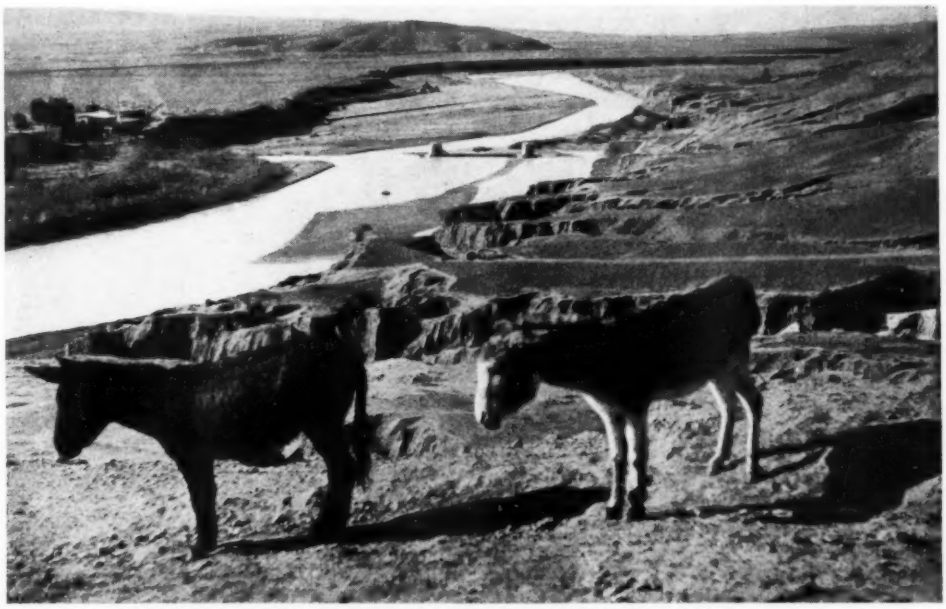
The by-laws of the Association require that the Committee name a slate of officers to be submitted to the membership for letter ballot during December. Members having suggestions for nominations should submit them to the Committee on Elections on or before November 1.

The by-laws also provide that members may make nominations directly provided such nominations are signed by not less than twenty-five members of the Association. These nominations should likewise be sent to the Committee on Elections on or before November 1. All communications should be addressed to the Committee on Elections, The American Forestry Association, 919 17th Street, N. W., Washington, D. C.

CONTROL OF LITTLE WATERS IN NORTH AFRICA

Buried in the Sands of Two Thousand Years, Ancient Roman Works to Control Little Waters Emerge to Guide and Serve Present-Day Conservationists

By W. C. LOWDERMILK
Chief of Research, Soil Conservation Service



Nowhere are lands more in need of water than in North Africa—and nowhere has there been such destruction of means to conserve it. Note the silted reservoir above

NORTH AFRICA bristles with astounding ruins of opulent and populous cities and of thousands of villages and works of the Roman epoch. Usually more attention in archaeological investigations has been given to evidences of artistic development in splendid mosaics, architecture and sculpture than to those of the agriculture, which nourished not only the great population of North Africa, but furnished supplies of wheat and olive oil to Rome. True, the traces of agriculture are more easily effaced by time and natural processes; but ruins of an extensive series of works to control little waters imply a surprising refinement in soil and water conservation two thousand years ago.

These evidences have been turned to practical uses by the French Administration in recent years. The works comprise check dams, terrace walls, field cisterns, water development and aqueducts for villages and cities. Romans never developed large dams to store water in reservoirs for irrigation or municipal use, but they developed methods of using storm waters far out toward the desert of Sahara.

Much excellent work in archaeology and historical research has been done in North Africa, and it is being used as a basis for restoring agricultural production equivalent to that of Roman times. There is special interest in finding ruins of olive oil presses in deserted areas void of an olive tree as far as the eye can see, and in cisterns and in check dams and terrace walls in otherwise parched and barren lands.

For a long time the presence of such ruins in deserted lands visited seasonally by Bedouin nomads and their herds was used as evidence of adverse climatic changes since Roman times. But such students of the problem as Gsell, Gautier and Leschi have come to the conclusion that during historical times no major change of climate has occurred. However, changes have occurred locally by reason of denudation of the land, with consequent loss of effective rainfall in storm run-off waters. Such a conclusion has far-reaching implications when Africa is being looked upon for resettlement.

These implications call for more thorough and complete archaeological studies with special attention to fixing the zones of various types of land and water uses during Roman times. A more detailed reconstruction of the agriculture of the area is called for than is given to usual studies of ancient civilizations. It is important to know what crops were grown in an area and how soil and waters were used and conserved.

The olive plantations about Sfax, Tunisia, stand out as a striking example. Until fifty years ago the region

The ancient Romans built check dams to retard and divert storm waters, and the ruins of one of these may be seen above, in the right foreground. It is located on the rim of the Sahara Desert near Tebessa, Algeria

Although North Africa has been under the blight of the goat for two thousand years, evidence of early Roman works to conserve water are found today. Old wells, such as shown above, are still in use throughout the lowlands

An old Roman well and cistern near Sfax, Tunisia, which, like hundreds of similar ones, has been restored for use of nomads and their herds. When repaired, some of these old cisterns will hold 28,000 cubic feet of water

about Sfax was devoid of olive trees; it was a desert plain given over to seasonal grazing by nomad herds. But archaeological evidence in ruins of cities and oil presses showed that during Roman times the extensive plain was planted to olive trees. If the climate had not changed then olives should grow today. Proceeding on this assumption experimental plantings were made; they succeeded, and now thousands of acres are planted to olive trees, producing great quantities of oil and supporting the thriving city of Sfax.

In consulting Dr. Leschi, director of Antiquities for Algeria, we selected some typical areas for field inspection of works of little waters control. They were, first, Timgad, in Algeria, second, the region south of Tebessa, also in Algeria, and third, the region near Sbeitla in Tunisia.

Thamugadi, the Roman name of the ancient city whose present ruins are called Timgad, was founded by Emperor Trajan in the first century, A. D., for an outpost of the III Legion, and as a defense of the southern boundaries of the Roman Empire. The city was fully planned before construction began, as evidenced by the symmetrical and regular location of streets. Although supported as a military city, it grew to importance in its own right, being nourished by extensive olive and grain culture and by hunting of wild animals in the forests of the Aures Mountains, overlooking the city. One is filled with amazement at the exquisite work of embellishment of public and private buildings with decorative carvings, sculpture and marble columns, such as forums, library, temples, theatre, and public baths. Suffice it to say that Timgad is one of the wonders of North Africa.

Water for this city of about 25,000 Roman citizens and an unknown number of slaves, for general uses and for twenty-two public baths, was developed in a big spring at the foot of the Aures Mountains, three miles from the city. It is probable that the city was located with special reference to this spring. An aqueduct, two feet wide and two feet, four inches deep, brought water to the city. A deposit of lime on the side walls shows that the most common depth of flow was sixteen inches. The slope of the aqueduct across the valley floor was estimated at from one to two per cent. Assuming a cross section of three and a half square feet and velocities of from one and a half to three feet a second, the discharge a second would have been from slightly over five to about ten cubic feet.

Assuming the number of slaves to be approximately equal to the number of Roman citizens, this would mean a daily per capita use of between eight and sixteen cubic feet, or an average of about twelve cubic feet per person—a very generous supply in modern terms.

It was necessary to develop water at this same source when the present archaeological works began in 1881. The water level of the spring in the new development was found to be thirteen feet lower than the level of the water which discharged through the Roman aqueduct. Lowered water tables are found elsewhere in this area.

Prior to 1881 the ruins had been covered for twelve centuries and were grazed over by herds of sheep and goats. Only the Triumphal Arch of Trajan remained above the accumulations of dust through the centuries to furnish a clue to the buried city; otherwise it might still be unknown.

We were shown recent findings which have not yet been reported in publications. They included a system of underground tunnels to drain an ancient malarial marsh northwest of the Roman city of Thamugadi. A tunnel, two feet in diameter and made of a thick layer of Roman concrete, leads into a collecting reservoir through a decantation basin, thence by an aqueduct to a public bath in the ancient city. There is no suggestion of a marsh now; the surface is cut by a number of deep gullies and resembles an Arizona arroyo in May. A stone slab, telling that the work was authorized by the Roman Emperor, was discovered in the reservoir.

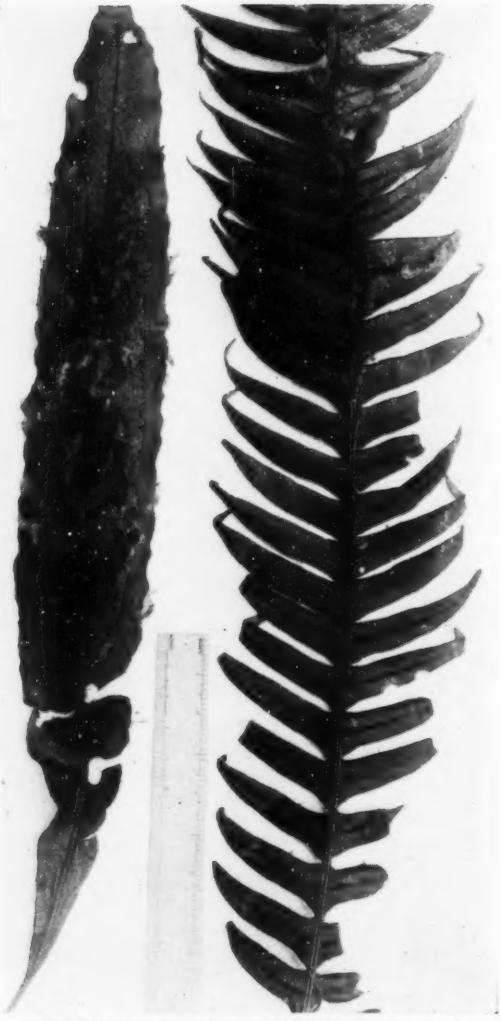
In the surrounding slopes of the valley check dams are found in the intermittent stream channels. These were evidently constructed to retard and to divert waters in canals of low gradient around the slope for supplemental irrigation of olive trees, and possibly of vines and for the conservation of storm run-off waters.

To test the prevailing conclusion that the climate has not changed generally in North Africa since Roman times, a small grove of olive trees was planted five years ago on the site of the ruins of Timgad. The trees were watered to carry them through the first three summers; now they are thriving without watering or irrigation and are provided only with small trenches to prevent the loss of run-off. The success of this experimental plantation is expected to stimulate the interest of local colonials to plant olive orchards, for ruins of oil presses are found about five-eighths of a mile apart for (*Continuing on page* 478)

All that remains of ancient Thamugadi, now called Timgad, whose 25,000 citizens and their slaves were provided with water from a large spring. The spring still exists, although its water level has dropped thirteen feet

The spring was located at the foot of the Aures Mountains, three miles from Timgad, and an aqueduct, a section of which is pictured above, was constructed to bring water to the city — an average of about twelve cubic feet a day for each person

While Timgad was buried in dust, the luxurious Roman city of Leptis Magna, east of Tripoli, shown above, was buried by marching sand dunes—and both cities crumbled when measures for control of little waters were destroyed with Roman civilization



Delicate mosses and liverworts inhabit the leaves of tropical ferns with no apparent injury to their host

TREE DWELLERS

By

L. J. PESSIN

"Where Java's isle, horizn'd with the floods,
Lifts to the skies her canopy of woods;
Pleased Epidendra climbs the waving pines,
And high in heaven the intrepid beauty shines,
Gives to the tropic breeze her radiant hair,
Drinks the bright shower and feeds upon the air.
Her brood, delighted stretch their callow wings,
As poised aloft their pendent cradle swings,
Eye the warm sun, the spicy zephyr breathe,
And gaze unenvious on the world beneath."

—Erasmus Darwin.

WONDERFUL indeed is the beauty of the orchid! High up on a branch it is perched, bathing in the glory of the glistening dew. Branch after branch and tree after tree are covered with these gorgeous fairies of the tropical forests.

The tree-inhabiting orchid belongs to a specialized class of plants known as air-plants or *epiphytes.* Although very abundant, air-plants are little known to most of us. They are really independent plants, for they derive their nourishment from the air, and cling to trunks of trees, rocks, fence-posts, and even telegraph wires only for physical support. They even inhabit the leaves of some plants with no apparent injury to the host. Most plants send roots into the ground to drink or absorb the water held in the soil. But the air plants have no connection with the soil, and some of them do not even have roots. They are able to obtain for themselves all the necessary food and water out of the moist air that surrounds them, and have even solved the problem of reaching the light without stretching their frail stems, or climbing over tall, massive tree trunks.

The air-plants are represented in nature by different kinds of flowering and non-flowering plants. Of the flowering plants, the orchids and the wild pines dominate the tropical forests, where shades of blue, pink, and purple add splendor to the jungle. Indeed, whole gardens of gorgeously colored orchids and trumpet-shaped wild pines mantle many a tropical tree.

The orchids possess peculiar roots, which are covered by layers of thin-walled cells that give them a gray or white appearance. As soon as a drop of water touches the root surface, however, a green color appears, as if by magic. This tissue of thin walled cells, which the botanist calls *velamen,* is full of air. When water touches it, the air is driven out, and the white tissue drinks or absorbs rapidly the particles of water with which it comes in contact, causing the green color of the roots to become visible through the wet surface.

The orchids have solved the problem of the keen competition for light in the tropics. Instead of growing on the ground in deep, dark forests, where the sun's rays rarely penetrate, they have found a way of occupying "pent-house apartments" on the tree tops close to the light, and at the same time securing their nourishment out of the air instead of competing with their terrestrial neighbors for every inch of ground.

The orchids of the tropics are not the only plants adapted to derive their food and water from the air; the Spanish moss of the southern United States has solved the problem even better. In its infancy it did away with roots altogether and retained only stems and leaves, which are covered with scales or flap-like structures that are able to absorb water and minerals from the air, just as the special tissue over the roots of the orchid is capable of doing. The Spanish moss—which is not a moss at all, but a true flowering plant—is especially abundant in the southern states, where it grows on trees, fence posts, and often telegraph wires. It is our most specialized plant, and has solved the problem of absorbing water and reaching the light without developing special massive organs. It is so much easier to "live on air"

than to fight for every inch of space on the ground, where greed and selfishness predominate.

Nor are the epiphytic ferns limited to tropics. As I am writing this, I see before me a tall, mighty oak whose branches are covered with numerous shiny green leaves of the "resurrection fern" so common in our southern states. This fern is a queer plant. We see it on a warm afternoon all curled up, as if it were too timid to face the bright sun. Soon after a rain, however, it unfolds and we see a mass of beautiful green drapery covering the huge branches and the main trunk of some of our common trees.

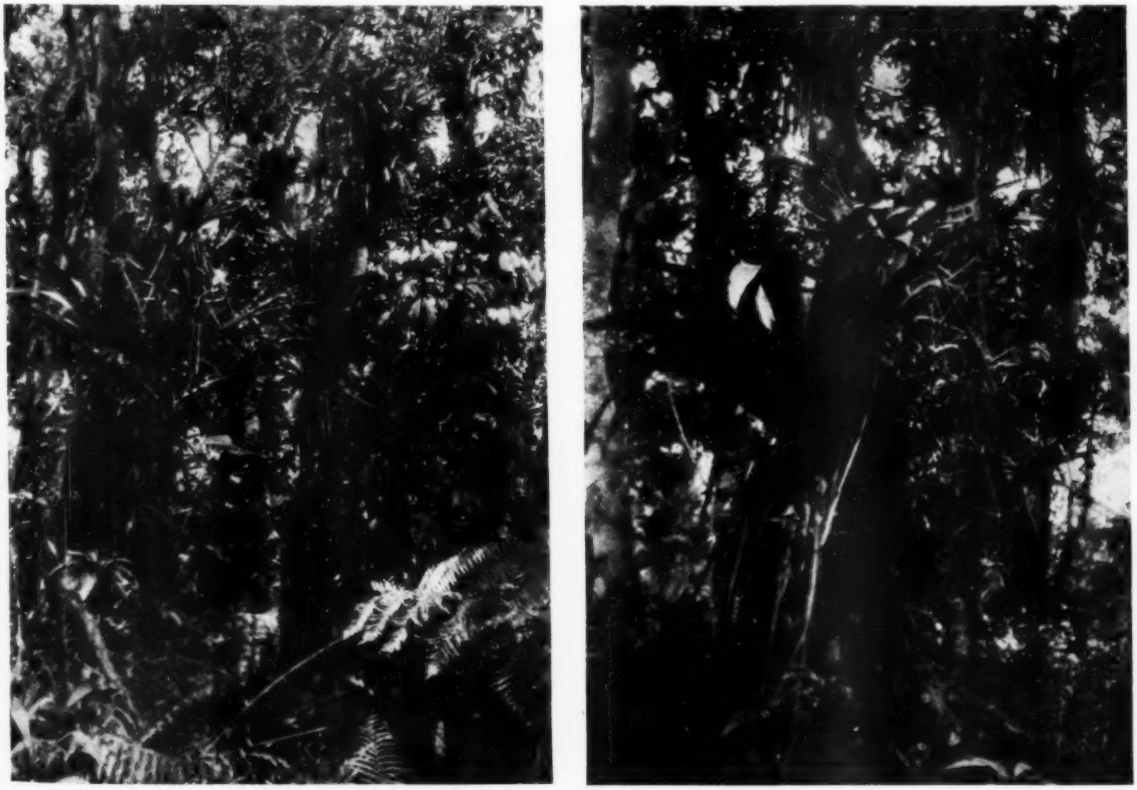
This fern seems to choose the tree on which it grows for it does not inhabit every tree; and even those trees which prove suitable are inhabited only on the north side, if the tree is in the open. Well adapted is this little fern to its dwelling place. It does not worry about a shortage of coal or the water bill. It hides its tiny thread-like roots beneath the bark of some huge tree to keep them warm and moist. When water is plentiful, these tiny roots drink or absorb water rapidly, and pass this precious liquid up to the curled leaves, which begin to stretch themselves until they are fully awakened. But when the vicious, dry wind or the harsh, hot sun seeks to touch the velvety skin of those green leaves, almost instantly they curl and expose their ugly, scaly, under surface. Very sensitive indeed is this "resurrection fern," but it seems to withstand intense heat and long droughts.

By far the most abundant of the air-plants in our native southern forests are the mosses and the lichens. As we wander through the woods, where the mighty oak and hickory dwell, we see all around us the velvety moss mantling the tree trunks and the rocks. It lives and works only to produce a small red pocket of dust-like spores. This pocket is on a long stalk, which emerges from the tip of the green leafy moss. A primitive plant, this moss has a small and frail body, needs little light and little water. Yet how it fights drought! Its small leaves possess tiny thick-walled cells, which do not part readily with the water they contain. Even the stubborn, dry winds are unable to draw the water out of the plant.

Although abundant in the forests and on mountain tops, lichens live and die in obscurity. The reason is that few of us ever take notice of them. Nature has not given them the power to produce attractive flowers, but although Nature has deprived them of beauty, it has given them the power to live and thrive where no other plants can survive.

In reality a lichen is a combination of two plants. One is a colorless, thread-like plant known as a fungus, which is utterly incapable of making its own food out of the materials other air-plants are able to absorb from the air. The other partner in the lichen association is a minute green or blue-green alga, which is able to manufacture its own food out of the raw materials provided it, but utterly incapable of protecting itself against drying winds. So the thread-like plant surrounds the minute green one, the partnership is established, and thus they live happily together. The fungus supplies the alga the necessary water and protection against drying out, the alga furnishes the necessary food.

Some lichens are leafy, others are beard-like, while still others form crusts on rocks and on the hard surface of the earth. But the lichens present an especially magnificent picture when they (*Continuing on page* 469)



In the forests of the British West Indies the air plants make a beautiful display—orchids and "wild pines" perching high on the branches of the trees

CONGRESS GETS FOREST RESTORATION PLAN

A BILL WHICH reaches a new high in proposed forestry legislation was introduced in Congress during the last days of the session just ended. The proposal if written into law would have the effect of making the federal government banker and manager of forest lands owned by farmers and other individuals, corporations, associations, states, counties, townships, municipalities and other political subdivisions of the state provided the owners desire to take advantage of the federal services offered. All funds advanced or expended in the restoration of any forest property by the government, however, would constitute a loan from the United States and would be repayable under long term contracts as receipts from sale of forest products grown permit.

Far-reaching in its possibilities and heralded by its advocates as the greatest forestry proposal since the establishment of the national forests, the legislation is designed to hurdle the barriers to the practice of forestry on private lands in this country. The chief barrier in the opinion of proponents of the bill is lack of finances for long term investments on the part of private land owners. This situation the bill would meet by giving owners access to federal funds and managerial aid through so-called self-liquidating loans.

First introduced on July 18 as H. R. 7271 by Congressman Fulmer of South Carolina, a companion bill (S. 2927) was filed in the Senate on July 31 by Senator Walsh of Massachusetts, supported by Senators Byrnes of South Carolina, Brown of Michigan and LaFollette of Wisconsin. The favorable reception of the proposal, particularly by farm groups, during the short period since its introduction indicates that the proposal is a type of federal-aid forestry legislation to be reckoned with in the next session of Congress.

The bill as drawn would:

(1) Authorize and direct the Secretary of Agriculture to enter into cooperative agreements or leases with forest land owners providing for management and administration under specified contractual terms.

(2) Provide for the appointment in each state by the Secretary of Agriculture of an advisory committee consisting of the state forester, state director of agricultural extension, representatives of the United States Forest and Soil Conservation Services and three legal residents of the state, this committee to work out a forest restoration program for the state and to designate "forest restoration units." The committee's program would be subject to approval or modification by the Secretary of Agriculture. The state committee would also be charged with appointing a county advisory committee in each county of its state consisting of the county agricultural agent and four legal residents of the county to aid in formulating the restoration program affecting the county.

(3) Provide that agreements or leases entered into with the government shall specify the work to be done on the owner's property, its estimated cost and the maximum amount to be expended per average acre. The work required might include planting, thinning, cruising, harvesting and marketing of forest products and protecting the forest growth from trespass, fire, diseases and insects. Such work as would be specified by contract or lease would have "to be performed in such manner and under such conditions as the Secretary determines most advantageous." All expenses incidental to restoration of a property to forest productivity would be paid by the government and in addition an annual rental fee not exceeding "the average annual taxes assessed on such lands during the five year period immediately preceding the signing of the lease." The owner would retain title to his land subject to a lien of the United States as security for repayment of all advances for taxes and expenditures for management.

(4) Make all agreements or leases continue in force for a sufficient period to enable the owner to reimburse the government in full for all sums expended in connection with the property with the exception that every owner entering into a contract would be allowed five hundred acres on which reimbursement to the extent of only fifty per cent would be required. "Such reimbursement" (to the government), the bill reads, "shall be secured by the income derived from the use of the lands and the sale of products therefrom less the cost of logging and processing."

(5) Permit owners to terminate their leases or agreements at any time on payment to the United States of the unpaid portion of the reimbursement due.

(6) Give preference in employment to owners and occupiers of land in forest restoration units and to qualified local persons in need of employment.

(7) Require the Secretary of Agriculture to utilize the United States Forest Service in administering the act and make it incumbent upon the latter to cooperate with state forestry and state extension agencies.

(8) Empower the Secretary to bid in at foreclosure or other sales any property subject to agreement or lease under the act but lands so acquired by the government would have to be sold or disposed of within twenty years. Property thus acquired would be exempt from all taxation while in possession of the government but twenty-five per cent of the gross receipts on a stumpage basis derived from operation of the property by the government would go to the state.

Concluding paragraphs of the bill authorize the President to allocate funds available for unemployment relief, public works and similar projects for use in carrying out the act. In addition, congressional authorization is provided for the appropriation of "such sums as Congress may from time to time determine may be necessary."

That the bill will get opposition as well as support between now and when Congress next meets is indicated by adverse comment already coming from various sources. Harris Reynolds, Secretary of the Massachusetts Forest and Park Association, issued a statement following introduction of the bill in Congress declaring that the plan is not economically or socially practical for Massachusetts. That state, he asserted, tried a similar plan some twenty years ago with the result that only thirty-six per cent of the woodlands turned over to the state for management were redeemed. The remainder passed to state ownership.

Mr. Reynolds further criticized the plan on the grounds that it would lead to federal domination of private forest lands, submerge state forest agencies, encourage the already debt burdened (*Continuing on page* 471)

EDITORIAL

A FOREST RESTORATION PLAN

ON page 458 of this issue, there is published a resume of a forest restoration proposal which was placed before Congress on July 18. Its central feature is a plan whereby owners of private forest land could obtain loans from the Federal Government for the restoration of their forest properties and for carrying charges including taxes. It further would make available to them the services of the government's forestry experts in the management of these properties. Loans and management costs, however, would constitute a federal lien on the property, to be liquidated as and when new crops of trees yield the necessary return.

The plan has been worked out by the United States Forest Service with the aid and support of some of the farm organizations who see in it a boon to the farmer for the better handling of his woodlot. It applies also to other owners of forest lands—individuals, organizations, corporations, states, counties, municipalities and similar political subdivisions. The Secretary of Agriculture would direct the undertaking and the Forest Service would administer and supervise it. Through state committees appointed by the Secretary, forest restoration units would be established in which forest lands after examination and appraisal by the Forest Service would qualify for the loans authorized. Qualification, it is assumed, would be based upon the government's judgment as to whether lands for which loans and service are requested form a sound investment of public funds from the standpoint of self-liquidation.

The objective of the plan is highly meritorious. It seeks to provide an "out" for the thousands of forest land owners who would like to practice forestry but have neither the knowledge nor the money. To what extent it would be successful in bringing extensive areas of private land under management and at the same time safeguard the necessary expenditure of public funds is open to question. The bill as introduced in Congress raises many other questions that will have to be clarified, we think, before a scheme of such far-reaching possibilities and implications will be acceptable to the public which must be the banker and take the risks. Since Congress has adjourned, there is ample time, fortunately, for it to be studied free of the usual pressure that attends a bill of this character when Congress is in session.

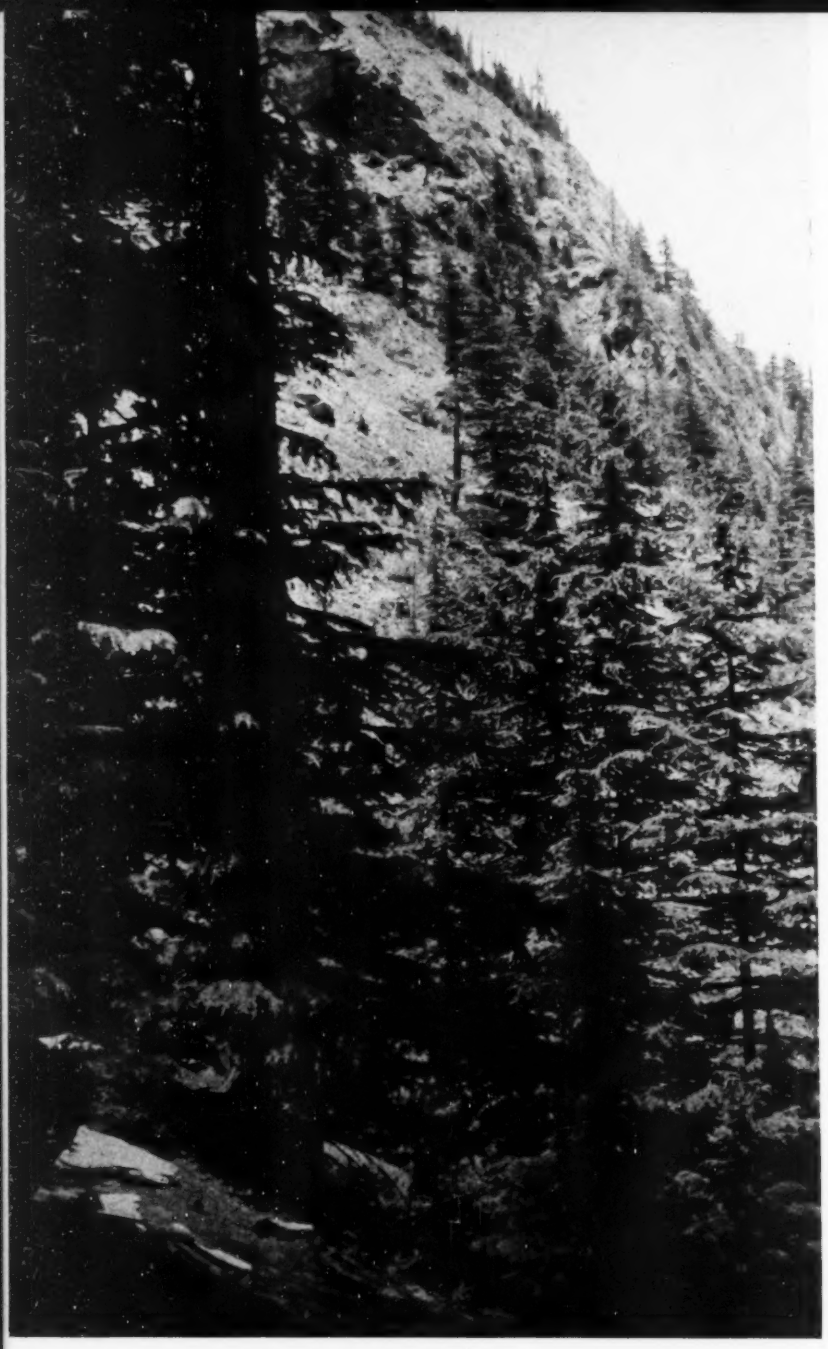
PATTERNS OF CONSERVATION

ONE of the reasons frequently advanced for a federal department of conservation is that many of the states have adopted this form of organization in dealing with state resources. Of the forty odd states now having forestry organizations, seventeen are organized with conservation departments. Fourteen have separate forestry boards or commissions and the remainder function through other state departments or agencies. There is no uniformity either as to the organization of conservation departments or the methods of state administration of conservation work.

A citation that many of the states have conservation departments therefore is merely a statement of fact and not an argument that this form of organization is best for the state and therefore best for the nation. There are too many varying factors and conditions as between states and as between state and federal problems of conservation. While the commission form has proved satisfactory in some states, it has by no means worked well in other states. This may have been due to politics, to the overshadowing importance of one resouree over another, or a combination of conditions peculiar to the state. Certainly a critical review of the efforts and experiences of the states in trying to arrive at the best form of organization to meet their particular conservation responsibilities does not yield a standard or conclusive pattern adaptable to all states or to the nation.

The experiences of the states have been brief and are still in an experimental stage. It would seem much more logical, therefore, particularly in considering the type of organization best adapted to national management of forests and related resources to turn to those countries which have passed through the experimental stages. In most of Europe, forestry long ago was accepted as a problem of growing plant and animal products from the soil, with the result that today forestry is a part of the departments of agriculture in Norway, Sweden, Finland, Denmark, Poland, France, Italy, Czechoslovakia, Belgium, Estonia, Greece, Irish Free State, Latvia, Lithuania, Spain and Turkey. Outside Europe the agricultural pattern of organization also prevails, including such countries as Argentina, Brazil, Venezuela, Union of South Africa, the Philippines, China, Japan, Netherlands, East Indies and Turkey. Notable exceptions are Switzerland, Germany, Canada and Russia. In Germany forestry became an independent agency with departmental standing in 1934, and in Canada and Russia jurisdiction of forestry is divided among several agencies.

Based upon the experience of other nations, the overwhelming evidence appears to be that for countries in which the conservation of renewable resources is a factor vital to social and economic welfare, forestry and agricultural matters should be in a common department of government.



TIES FOR THE RAILS OF INDIA

By

R. MACLAGLAN GORRIE, D.Sc.

Typical deodar country in an inner valley of the Himalayas. The tree grows best on very steep slopes, and old trees are marked for felling only as second growth crops are established to take their place. It is a slow process, requiring fellings at ten to twenty year intervals only

IN INDIA, the white ants, or termites, are so active in their attacks that all timber not naturally resistant or specially treated with preservative is very quickly destroyed. Consequently, the demand for railway ties for the immense distances of railway track is met partly by steel, partly by inferior timbers treated with creosote or salts, but largely by the few tree species which are naturally resistant. Of these the broadleaf sal tree, *Shorea robusta,* is the commonest, but in the northwestern part of India it is replaced by the deodar, *Cedrus deodara,* of the Himalayas.

The deodar is practically the same tree as the biblical cedar of Lebanon and, like it, grows on hills high enough to have some winter snowfall. In the Himalayas the deodar is found at elevations of from 6,000 and 8,000 feet, forming a belt of forest along with evergreen oaks and the blue pine, at that altitude. It also occurs as scattered trees in the higher spruce forest up to 10,000 feet.

The deodar prefers precipitous ground, and at its best development grows into a noble forest giant, trees 140 feet high and twenty feet in girth being frequently met in areas where the old trees have not been entirely felled. Most of the Himalayan deodar forests have been worked for a half century or more under a system of fellings aimed at insuring the continuity of the forest. Unfelled stands of the 300-year-old giants which formed much of the virgin crop are now only found in some of the less accessible blocks, but in most villages the deodar trees around the local temple have been preserved from generations back and now form handsome and venerable groves.

The felling, conversion and transportation of deodar for the railways and other markets is done under considerable difficulty. Trees growing on precipitous ground are cut to desired lengths where they are felled, and then transported, first to the nearest river, and thence by floating from 200 to 300 miles to the timber depots in the plains of India. Throughout these various stages there is no place for elaborate machinery, for neither the steep and inaccessible country nor the limited intelligence of the labor would permit it. Many experiments have been tried in this direction, only to revert to the simple and primitive methods which have stood the test of time. As an example, the use of the ordinary swivel-hooked peavy has been demonstrated and peavies issued, but if a log is to be levered or moved, they prefer to do this with a plain wooden lever made out of a sapling pole.

The trees marked for felling are first lopped right to the tip while still standing, the object being to reduce the damage to young growth when it is felled. The lopping is done by a man climbing barefoot with a small ax in his girdle; he goes right to the top and works downwards, the cut branches falling to the ground below him. On very steep ground the tree must be felled uphill, for it is only the severed butt resting against the stump that prevents the tree from shooting off downhill.

Once on the ground the tree is cross-cut into suitable lengths, then each log is squared by an ax-man using a heavy broadfaced ax. The log is trimmed to a multiple of scantling sizes, then saw guide-marks are made by twanging a taut string which has been dipped in charcoal paste.

One end of the log is jacked up and the sawyers start to work, generally a team of three to each primitive frame-saw, two women pulling from below and one man pulling from above, keeping his footing on a pole notched to make a ladder. These people camp in the woods beside their work, making simple shelters of light poles and bark. They move on through the forest with their babies and their few possessions wherever the work leads them. They spend the whole summer in these wild woodlands, where the fear of meeting a bear or panther or snake only momentarily damps their natural cheerfulness.

(*Continuing on page* 476)

The timber is sawn up where the tree falls, first by squaring with an ax and then by sawing with a primitive frame saw

Ties are stacked at the river's edge, ready for launching

Released to the waters, floating coolies must work to extricate ties from crevices in which the fierce torrent has wedged them

Wilderness Resurgent

(*Continued from page* 440)

better than their survivors, anyway. "They lived like lords and didn't know it," he said. " 'Course they didn't have any money, but then they didn't need any. They raised their food, and they knew how to make just about everything they needed."

They did, too. This self-contained, individualistic pattern of life collapsed many years ago, but evidences may still be seen of the mountaineers' remarkable ability to do things for themselves. The men knew how to erect homes of hewn logs and roof them with rived oak shingles; how to build sturdy chimneys with rocks and clay; how to shape implements over the forge; how to fashion furniture, water wheels, sleds, ox yokes, spinning wheels, and a hundred other things with a sharp knife and a few simple tools. Venerable grist mills, with their water chutes hewn from whole logs and turbines carved from a single section of a log, still turn in the back country. Inside the mill house are complicated arrangements of gear wheels, inset with teeth consisting of wooden pins. And, believe it or not, I once met an aged "covester" who used two sets of false teeth he had made from the root of a sourwood tree! Ingenuity and a resourceful artisanship transformed materials near at hand into what was needed for home and husbandry.

The women were no less resourceful. They were busy day and night carding wool from the family's sheep, spinning the yarn, and weaving the homespun cloth from which clothes were made for all members of the family. They employed methods of keeping vegetables and meats that are little known today.

Never was individualism more rugged than that once exemplified by these mountaineers. But their self-sufficiency was not destined to last. Weakened by developments that had been in progress for many years, their independent economy crumbled early in the twentieth century. The game gradually became less plentiful. Despite continuing immigration, the large families eventually brought about multiplication of ownerships that interfered with unrestricted grazing. The Southern Appalachians have seen grazing wars, just as the West has. The virgin soil of the slopes, yielding bountifully at first from ages of forest decay, surrendered its fertility upon exposure to the beating rains.

Then came roads and a few railroads, also tourists, and here and there small industries in the more developed valley areas. The mountaineers began to learn how the people of the "outland" lived—of their dependence on jobs, money, trade, manufactured goods, not to mention education and other benefits of organized community life. Finally lumbering on a large scale broke into the wilderness. Mountain men began to seek "jobs," and the ways of self-dependence were gradually forsaken. Those who got jobs could hardly buy with their wages as good a living as they had had before; but after their seclusion was broken, the folks became restless. Abandonment of hard won homesteads became general as people began to "move down."

Judging from the appearances of innumerable abandoned fields that I have encountered, I would say that the withdrawal attained proportions of a wholesale exodus shortly before the World War. The war, of course, accelerated the movement, bringing out as it did thousands of men for the army and providing employment for others who wanted to move out. Census population figures show steady decreases between 1900 and 1930 for the more mountainous counties in the Southern Appalachians. Acquisition of mountainous lands for national forests began about 1912 and augmented the retreat by making it possible for mountaineers to sell their little places.

The forest has not been slow to reclaim the vacated clearings. On thousands of sectors scattered over the region's maze of sprawling ridges the forest legions have been marching. Everywhere, even in the most recently abandoned fields, the will of the wilderness to repossess its former domain is evidenced. Rank on rank of poles and saplings surround clearings that diminish in size yearly, and advance guard patrols of seedlings extend multitudinous fronts each year. The fields abandoned earliest—around forty or fifty years ago—now have dense stands of young timber, including some of the finest second-growth poplar, oak, and pine in the whole region.

Few forests within the temperate zone have as little racial unity as the southern mountain forest. More than 130 different species of trees compose it, of which several dozen are abundantly represented. Through struggle too old for time to matter certain species and associations of species established their spheres of sovereignty in the virgin forest. Each of the numerous racial groups had its particular place, a stability of tightly drawn forces prevailed, and natural change was gradual like the wasting of mountains.

This long-standing balance of power could not hold the new forest that is taking the deserted homesteads. In the wave of reoccupation oppressed minorities have asserted their will to expand. Shifts in sovereignty and rearrangements of racial groups have occurred. Yellow pines, for example, were generally crowded off the better lands to infertile, stony places in the original forest. Thanks to the mobility of their winged seeds, they have forged ahead and established themselves numerously on the former clearings. Limited to scatterings of veterans in the old forest, yellow poplar has speedily appropriated thousands of acres of the best growing sites. The wilderness resurgence has produced no result so pleasing to the forester as this vigorous expansion of the yellow poplar. Fine looking pure stands of this valuable species are now abundant. While some species have gained ground, others, like hemlock, have lost. Because of their characteristic compositions and trim uniformity, sometimes almost suggestive of having been planted, the old field stands will be clearly recognizable for many decades.

As the wilderness restores its fabric of forest over the deserted house places, a unique and compelling chapter of the American story is brought near its close. Nowhere among all its diverse and vital scenes has this nation reared a people like the mountaineers of the Southern Appalachian back-lands. Behind mountain walls that turned back tides of change agitating the lands beyond, they lived to themselves and lost track of time. Pitted against a grudging environment, these hill folk developed unforgettable characteristics of self-dependence, quiet strength, simple faith, and the ability to do somehow with few resources. Who, having known its people intimately, will deny what the wilderness gave to the human spirit for the deprivations it exacted? Outsiders have been deeply impressed by the happy outlook of the true southern highlanders. Immune to any dullness from lack of interests, they were respon- (*Continuing on page* 476)

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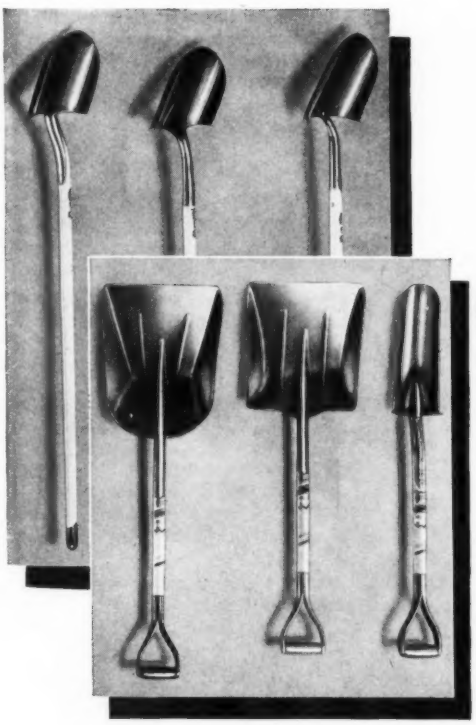

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FOREST FIRES CLAIM FIVE LIVES

A WESTERN forest fire season that on August 1 exceeded in severity that of last year claimed the lives of five CCC enrollees in Nevada on July 28. The tragedy occurred on the Toiyabe National Forest in central Nevada and resulted from a brush fire started by lightning. A change of wind suddenly reversed the course of the fire with the result that a group of CCC boys, which had been dispatched as fire fighters from Company 1212, Paradise, Nevada, were caught and five of them unable to escape. Those lost were:—Ernest Tippin, Project Assistant of Oswego, Kansas; Walter James of Ridgewood, New York; Frank W. Barker of Brooklyn, New York; George J. Kennedy of New York City and Frank J. Vitale of Brooklyn, New York.

The following account of the fire and tragedy is given by the Ogden office of the Forest Service:

"Shortly after its start from a lightning strike at 11:30 a.m. on July 28 the Orovada fire was sighted by K. O. Studebaker, a storekeeper at Orvada, and other nearby ranchers. These people immediately reported the fire to the Paradise CCC Camp forty-five miles away and themselves proceeded to the fire, three traveling by horseback and four by car.

"About 2:00 p.m. the first truck load of CCC boys from the Paradise Camp arrived at the end of the road and continued to the fire on foot. One crew of thirteen men, including Foreman Timmons, went to the north side of the blaze which at that time had covered about twenty-five acres. Another group in charge of Assistant Leader Tippin started for the south side, where the seven local men were already working and making control progress. Both crews were approaching the fire from the downhill side with the wind in their favor.

"When Tippin's crew had progressed about a mile, coming within a quarter of a mile west of the lower edge of the fire, the wind suddenly changed and developed into gale proportions, blowing directly down the mountain opposite the usual prevailing direction and contrary to normal air currents for that time of the day. The fire immediately started to run down hill, and Tippin, perceiving the danger, gave the order to retreat. Six of the twelve boys who were slightly behind the others in Tippin's crew immediately turned and escaped on the flank of the fire, reaching the Gabica ranch in safety.

"George J. Kennedy of the advance group of six in the first few steps of retreat suffered a compound fracture of his ankle. Responding to his call for help, the crew leader, Tippin, together with Walter James, went back and tried to carry him with his arms over their shoulders. The other three boys, Frank W. Barker, Frank J. Vitale, and Richard Powers, were a short distance ahead. According to Powers, Barker either became exhausted or suffered some injury and fell down several times while running. Powers attempted to help him until he was forced to run for his own life, and so he managed to escape to safety.

"From this point on there were no eye witnesses, and conclusions could only be drawn from the mute evidence of the bodies as they were found. Kennedy was found about a quarter of a mile below where Tippin and James had picked him up and tried to carry him. This was just a short distance above where Barker was last seen alive. Barker, however, was found nearly a quarter of a mile beyond the place where he was last seen, together with the bodies of both Tippin and James. From this situation the assumption is drawn that Tippin and James carried Kennedy until the flames got so close that they were forced to leave him. From then on they probably gained on the fire and encountered Barker, whom they tried to assist to a point of safety, since the three of them were found within a few feet of each other. They were but a couple of hundred feet from a small unburned area where they might have been safe if they had reached it.

"From evidence at hand there seems no doubt that Tippin and James performed acts of outstanding heroism in attempting to give aid to the other two boys and lost their lives on that account. Since those two were the strongest and huskiest of the crew, they could have made it easily to safety had they been unhampered.

"Vitale had made it to a point of safety along the route followed by the first crew of six who escaped. He reached Rock Creek, but instead of following it to the Gabica ranch, for some unknown reason he crossed the creek and started to climb the opposite mountain slope, possibly to reach some rock ledges where he thought he might be safe, but he was overtaken by the fire before reaching his objective.

"At about the same time that the CCC crew began to retreat, the seven local men also retreated toward the valley, three on horseback and four on foot. They traveled as fast as they could until the car was reached, parked some distance off the highway, and according to their statements they were at no time more than 150 or 200 feet ahead of the flames. John Gabica, riding a tired horse, was afraid the horse would not be able to make it to the highway ahead of the fire and abandoned his horse and got into the car. The other horseback riders rode ahead of the fire to the highway and the men in the automobile made the highway a few minutes ahead of the flames. Later the abandoned horse arrived at the ranch with half of his tail burned off.

"Fire fighters of wide experience are unable to recall any other instance either in timber or brush where fire ran down steep slopes for such great distances so fast that men were unable to keep out of the way. The reason for the downhill wind early in the afternoon resulting in fire behavior contrary to all experience and causing the death of five men will probably never be known."

Throughout the west forest men are facing an increasingly hazardous fire situation. As this issue goes to press the hottest spot appears to be the Pacific northwest, particularly Oregon. It is reported that in that state fires are sweeping over the old Tillamook burn, scene of Oregon's worst forest fire, where in 1933 flames swept over 300,000 acres and left ten billion feet of timber a blackened shambles of down timber and standing stubs. A fire of 60,000 is reported out of control in this area, and that it is feared the entire area of 300,000 acres will be burned over again. Conditions throughout the entire region of northern California, western Oregon and Washington and northern Idaho are extremely critical. As of August 12 several fires were out of control. One was of 4,000 acres on the Columbia Forest in Oregon and another of 3,000 acres on private lands north of the Olympic Forest in Washington. Throughout the region, federal, state and private forest fire fighting organizations are being pushed to the limit.

According to the Forest Service, the number of fires on western National Forests thus far this summer are exceeding the number of last year. Scarcity of rain, combined with high temperatures, is the underlying cause of the hazardous situation. On the other hand, the record shows a seven per cent rise in man-caused fires this summer compared with the same period last summer.

The fire situation in eastern states is less hazardous, although the drought in upper New York and New England has created critical conditions in that section, particularly in the areas where the hurricane of last September has left much down timber. Thus far, however, the region has escaped any large conflagrations, owing to the alertness of forest protective agencies and the general public fire-mindedness of the people.

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FIRE-FIGHTERS AND THE WAGES AND HOURS ACT

BY JOSEPH RAUH

Assistant General Counsel, Wage and Hour Division, Department of Labor

THE Wage and Hour Division of the Department of Labor has received several letters from fire-fighting associations and from individual employers inquiring as to the application of the Fair Labor Standards Act to employees engaged in fire-prevention and fire-fighting activities.

Whether employees engaged in fire-protection activities come within the purview of the Act depends upon whether they are "engaged in commerce or in the production of goods for commerce." Section 3(j) of the Act provides that an employee shall be deemed to have been engaged in the production of goods if such employee was employed "in any process or occupation necessary to the production" of such goods. In determining the applicability of the Act, consideration must be given to differences in the nature of the employment, the types of property which are the subject of the protection, and the purposes for which protection is provided.

At least two different fact-situations may be considered. The first covers the situation where the employees of an individual employer, engaged in lumber or logging operations, are engaged in preventing and watching for fires. In addition, the employer's employees usually engage in fire-fighting when the emergency occurs. Ordinarily, fire-protection by the employer's own employees is carried on for the protection of cut logs or lumber or standing timber which are the subject of the employer's current operations, and which the operator intends, hopes or has reason to believe will move, directly or indirectly, in interstate commerce. (See paragraphs 2, 4 and 5 of Interpretative Bulletin No. 5.) The prevalence of such fire defense practices among companies engaged in lumber or logging operations is indicative that such enterprises cannot operate otherwise. Consequently, in the opinion of this office, employees of companies carrying on lumber or logging operations who are engaged in fire defense and fire-fighting activities in connection with the protection of cut logs, lumber or standing timber which are the subject of the employer's current operations are clearly engaged in a "process or occupation necessary to the production" of the goods which will move in commerce and are, therefore, entitled to the wage and hour benefits of the Act. Whether such employees are within the quoted language when they are engaged in such activities on that portion of the employer's property which is the subject of his contemplated operations is not here necessary to decide in view of the considerations set forth in the next paragraph.

Frequently employees of a lumber or logging company may engage in fire-defense and fire-fighting activities on portions of the company's property which are not the subject of its current operations. Without determining whether the employees in question are, during the period in which they engage in such activities, engaged in the "production" of goods for commerce, they may nevertheless be entitled to the wage and overtime benefits of the Act. Except under the circumstances described in the next succeeding paragraph, this would be the situation if, during any part of the workweek in which the employees engaged in such activities, they also engaged in activities in connection with or incidental to the company's logging or lumber production operations. (See paragraph 9 of Bulletin No. 5.) This office has consistently taken the position that, where an employee of a particular employer is engaged in the production of goods for commerce during any part of a workweek, he is subject to the Act for all hours that he works for such employer during that workweek.

In certain cases employees of lumber companies or of other employers subject to the Act may be called from their regular employment by the United States Forest Service or by a similar state agency to engage in fire-defense or fire-protection activities. Where such employees are placed on the pay roll of such an agency, receiving their sole compensation from such source, and fight fires under the exclusive direction and control of representatives of the agency, it is our opinion that the employees become the employees of the federal or state agency. Since Section 3(d) of the Act so defines "employer" as to exclude "the United States or any State or political subdivision of a State," such employees, during the period of time they are drafted by the government agency under the circumstances described, are not entitled to the benefits of the Act, and for the purpose of computing the overtime compensation to which such employees may be entitled from their regular employers, the hours spent during such a period shall not be considered as a part of the time worked in any particular workweek for their regular employers.

The second situation involves the more usual type of fire-protection by independent forest fire associations. Membership in these organizations is held by various types of persons and companies, including lumber and logging companies, banks and trust companies, private individuals and farmers, railroads, pulp and paper companies, land and development companies, and political subdivisions of the state. Usually, the owner of forest land is required by the applicable state law to protect his property from fire. This he may do either by joining an association of the kind under discussion or by paying a certain amount to the state, which, in turn, may use the money to pay the associations for fire-protection.

The associations cooperate with the United States Forest Service, the United States Indian Service and with the several state forestry agencies. They enter into mutual agreements for protection of areas in which land ownership is mixed, thus avoiding duplication of protection forces. Payment is made under such agreements by one agency to another for services rendered. If a fire occurs on land outside the area patrolled by the associations, they fight such fire until the responsible agency takes over.

The obligation to pay for fire-defense is imposed regardless of the purpose for which the timber or forest land is to be used. Thus the owner may use the land for recreation, grazing or other lawful purposes divorced from lumber production, or may sell or donate the property to the state or federal government for public purposes. Similarly, the fire-protection activities of the associations are pursued with a variety of purposes and objectives. Thus, fire-protection is necessary to maintain watersheds so as to insure the existence of water for irrigation purposes. The prevention of floods and the maintenance of scenic and recreational values constitute additional reasons for carrying on fire-prevention and fire-fighting activities.

In our opinion, the employees of the fire-fighting association, while engaged in fire-defense for the purposes outlined above, and to the extent that they do not protect cut logs or lumber or standing timber which are the subject of a producer's current operations, are not engaged in a process or occupation necessary to the production of goods for commerce, and are, therefore, not covered by the Act. What constitutes the subject of "current operations" will, of course, vary under different sets of circumstances. Without attempting to set any fixed limits to the meaning of this phrase, it is our opinion that, at the least, the subject of "current operations" includes an area of timber on which work is performed incidental to its preparation for cutting, such as road-building, laying in of railroad spurs and similar activities. And, to the extent that the employees of these associations are protecting cut logs or lumber or standing timber which are the subject of current operations, it is our opinion that the courts will properly hold such employees subject to the Act.

I wish to make it clear that the opinions expressed above are not binding upon the courts and will not protect an employer from an employee's suit under Section 16(b) to recover double the amount of his alleged unpaid minimum wages or unpaid overtime compensation. They will, however, serve as guides to the Administrator in carrying out his duties of enforcement under the Act.

SANTA ROSA BECOMES A NATIONAL MONUMENT

Santa Rosa Island, a 9,500-acre island off the coast of Florida and cradle of conservation in America, was made a national monument by the Congress recently adjourned. While the island is largely a sand barrier, illustrative of the processes by which much of the shoreline of the continent is formed, it was the scene of the first reforestation efforts in America. This was back in 1828 when President John Quincy Adams, concerned that the supply of live oak timber needed for the building of war-ships would become exhausted, withdrew several thousand acres on Santa Rosa Island as a plantation for the growing of live oak. Considerable planting was done but the project was short lived, because the idea was abandoned when Andrew Jackson became President. Santa Rosa Island, nevertheless, is pointed to as the government's first venture in forest perpetuation.

The island is only one of numerous additions made to the National Park system during the past fiscal year. Additions aggregating 1,600,000 acres were made, including five national monuments, three new historic sites, and lands added to existing parkways, national monuments and national parks.

JUNIOR C. OF C. OPPOSES FORESTRY TRANSFER

At its annual meeting in Tulsa, Oklahoma, on June 24, the United States Junior Chamber of Commerce, composed of young business leaders throughout the country, went on record as opposed to disruption of the federal forestry work by transfer of the Forest Service from the Department of Agriculture. This position was taken in a resolution unanimously passed and reading as follows:

"Whereas the U. S. Forest Service, operating in its present capacity for over thirty years, has built up an organization that has proven highly efficient in the management of our resources and has acquired the esteem and cooperation of all visitors and users of the forests, and

"Whereas, there is being urged upon the President of the United States a proposal to transfer the U. S. Forest Service from the Department of Agriculture to the Department of the Interior, and if this move is accomplished, the proponents thereof further propose to institute multiple management of the forest areas under which the various resources will be managed by different bureaus,

"Now Therefore Be It Resolved—That the United States Junior Chamber of Commerce is opposed to any change in the status of the Forest Service or the transfer of it, or any of its functions, from the Department of Agriculture."

WISCONSIN ENCOURAGES PRIVATE WILDLIFE REFUGES

The Wisconsin Legislature at its recent session passed an act designed to encourage the establishment of privately held wildlife refuges, sanctuaries, and rare natural formations. This encouragement is in the form of an act exempting all such properties from taxation provided they are privately held for non-profit use and for the purpose of preserving native wildlife, plant life, historic works of ancient man, and geological formations of scientific interest. Under the act the properties must be approved for tax exemption by the county board and must be open to the public under reasonable restrictions.

The same legislature also passed an act for the protection of certain wild flowers of the state by making it unlawful to pick or dig up the following varieties from public or private properties, except for scientific purposes and with the consent of the State Conservation Commission: American lotus, trailing arbutus, all lady's slippers, all orchids, trillium, American bittersweet, pitcher-plants, and wood lilies. Violation of the act is punishable by a fine of not exceeding one hundred dollars or a sentence in jail for not more than six months.

FILM STRIPS AVAILABLE FOR CONSERVATION SUBJECTS

The Department of Agriculture has announced that it has available a series of 325 film strips which will be available for educational use at prices ranging from fifty to seventy cents each. These strips are particularly adapted for the use of individuals, organizations and schools interested in advancing educational work in the fields of conservation and agriculture. The strips cover such subjects as soil conservation, farm forestry, dairying, farm animals, plant and animal diseases and pests, farm economics, farm management, home economics, adult and junior extension work. Lecture notes are provided with each film purchased.

A price list of available film strips and instructions on how to purchase them may be obtained by writing the Extension Service, United States Department of Agriculture, Washington, D. C.

BIG BEND LAND-GRANT BILL SIGNED

Through legislation recently signed by Governor O'Daniel of Texas, lands originally set aside by that state to provide a source of income for schools are to be transferred to the federal government as part of the proposed Big Bend National Park whenever the State Parks Board, charged with purchasing land for this park, desires to make the transfer. Approximately 240,000 acres within the boundaries of the proposed national park, including 105,000 acres in Big Bend State Park and 1,280 acres in Santa Helena State Park, are state-owned.

In accordance with the Act of Congress calling for the establishment of the Big Bend as a National Park, the area cannot be administered as such until 788,000 acres of land within the boundaries specified by Congress have been turned over to the federal government.

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FORESTRY IN CONGRESS

Congress Votes One Billion Dollars for Conservation

WRITTEN in the thirteen billion dollar bill of expenditures authorized by the Congress that adjourned on August 5 are items aggregating approximately one billion dollars for the conservation of soil, water, forests, wildlife and other organic resources. These items include both regular appropriations for the fiscal year 1939-40 and allocations thus far made from funds voted for unemployment relief.

Chief item in the list is $500,000,000 for payments to farmers by the Department of Agriculture for soil conservation practices. The remainder is divided among the Civilian Conservation Corps and the conservation bureaus of the Departments of Agriculture and Interior. A summary of the principal appropriations and the relief allocations for conservation work is given in the table in round figures.

Department of Agriculture	Regular Appropriation	Unemployment Relief Allocation
Soil Conservation Payments	$499,560,000	
Forest Service	30,905,500	$ 6,940,000
Soil Conservation Service	31,460,800	6,369,000
Miscellaneous	1,993,492	3,811,634
Total	$563,919,792	$ 17,120,634
Civilian Conservation Corps	295,000,000	
Department of the Interior		
National Park Service	3,574,140	5,727,219
Indian Service	501,500	
Biological Survey	4,053,691	603,987
Grazing Service	1,000,000	
Bureau of Fisheries	2,144,100	415,000
	$ 11,273,431	$ 6,746,206
Totals	$870,193,223	$ 23,866,840
Grand Total	$894,060,063	

Grouped under the miscellaneous activities for the Department of Agriculture are items made available for farm forestry and for control of forest insects and diseases. Control of the Dutch elm disease, for example, is provided with a regular appropriation of $500,000 and an allocation from WPA of $1,965,080; white pine blister rust control with $300,000 and $1,205,709; control of gypsy and brown tail moth with $375,000 and $640,845.

Not included in the above calculations is an item of $795,000 in the Third Deficiency Appropriation Bill, passed on the last day of Congress, for the purchase of some 180,000 privately owned reindeer in Alaska to be turned over to the Eskimos. Not included also is $875,000 which the Biological Survey will receive from the sale of duck stamps.

Additional allocations of emergency funds may before the end of the year bring the total conservation budget to well over the one billion dollar mark. The PWA allocation to the Bureau of Fisheries, it is interesting to note, includes an item of $125,000 for outfitting a vessel to serve as a floating research laboratory along the Atlantic Coast.

During the final weeks of Congress no conservation legislation of national moment was passed. Most of the pending bills were lost in the closing jam over the neutrality and spending-lending measures. Among these was the bill to establish the Kings Canyon National Park in California. Passed by the House on July 18 and reported by the Senate Committee on Public Lands on August 3, this bill was short-circuited by Senator Pittman of Nevada who objected to its consideration when it came up on the Senate calendar. As enacted by the House, however, the objectionable feature of the bill that would have authorized irrigation and power developments within the park had been stricken out. The section permitting grazing, on the other hand, was retained.

The various bills for control of stream pollution likewise failed to run the congressional gauntlet. The only bill in this group that made progress was the so-called Barkley bill, S. 685, which over the objection of the Izaak Walton League and other conservation groups was passed by the Senate but was not acted upon by the House. A similar fate befell S. 1108, to restrict the exportation of Douglas fir peeler logs and Port Orford cedar logs; S. 231, to authorize the acquisition of forest lands along federally constructed highways in order to preserve or restore their natural beauty; and, H. R. 3406, to permit funds for the control of the white pine blister rust to be expended on private as well as federal lands when in the judgment of the Secretary of Agriculture such expenditures are necessary in controlling outbreaks.

Among bills passed during the closing days of the session were the following: H. R. 2990, extending the Civilian Conservation Corps to July 1, 1943; S. 26, empowering the President to create new national forest areas in Montana; H. R. 2752 and H. R. 5747, making additions to the Kaniksu National Forest in Idaho and the Wenatchee National Forest in eastern Washington, respectively; H. R. 5625, regulating interstate and foreign commerce in seeds; H. R. 3409, extending the boundaries of the Hot Springs National Park in Arkansas; H. R. 4742, establishing the Chalmette National Historical Park in Louisiana; H. R. 4938, creating a national memorial military park of Kennesaw Mountain in the state of Georgia; and S. 2046, changing the designations of the Abraham Lincoln National Park in Kentucky, and the Fort McHenry National Park in Maryland.

The following resolutions also were passed: S. Res. 160, directing the Tariff Commission to investigate the situation relative to the domestic production and importation of wood pulp or pulpwood; S. J. Res. 182, extending the life of the joint committee investigating phosphate resources; H. Resolution 284, authorizing a survey and study of national parks, monuments and shrines; S. Res. 170, authorizing a sub-committee of the Committee on Foreign Relations to inspect and study the Rainy Lake watershed in northern Minnesota; and H. Resolution 163, providing for an investigation of Alaskan fisheries.

Of the conservation bills passed, the President had at the time of going to press vetoed S. 6, to return a portion of the Grand Canyon National Monument to the public domain; and Senate Joint Resolution 160, to provide for the maintenance for public use of certain highways in the Shenandoah National Park. As to the former measure, the President said he felt the proposal had been given insufficient consideration. His veto of the latter bill was on the grounds that its enactment would subordinate national park standards to local considerations by encouraging local communities to urge the opening of minor roads in national parks for purely local benefits. The Joint Committee on Forestry left Washington without making plans for summer or fall hearings. Prospects are the new hearing of the Committee will be held at some point in New England.

Lake States Cutovers Present Critical Problems

Declaring that the exploitation of natural resources has created many social and economic problems but none more pressing than in the Lake States, President Roosevelt on July 31 sent to Congress a program of land and forest rehabilitation for the cutover area of northern Michigan, Wisconsin and Minnesota. The program was incorporated in a report prepared by the Northern Lake States Regional Committee of the National Resources Planning Board and dealt with 57,000,000 acres in eighty-six counties in the states mentioned.

Special emphasis is placed by the Committee on the possibility of restoring the forest resources of the region. "Few, if any, similarly large areas in the United States," the report declares, "have more wild land and water area in proportion to the population. * * * * There is no need for much additional farm land and but little of the wild land is satisfactory for such use. Forests at one time gave more employment than any other resource. Their improvement would employ many men. * * * * The lack of more and better reproduction and second growth is due not so much to cutting as to the repeated fires which followed cutting in the earlier periods."

Unemployment the Committee found to be the major problem of the area. The cutover area has more people than jobs and in the view of the Committee, the most promising source of relief is through restoration of forest resources, improvement of lakes and streams for recreation, the development of mining, and the movement of isolated settlers and those on very low grade soils to locations offering a better economic opportunity. Long-time capital loans to settlers on good land should also be provided and uneconomic units of government should be eliminated.

The Committee further recommends continuance and expansion of the present fire control programs, completion of acquisition in existing federal units, the establishment of a large scale public works program for forest restoration, formation by the Forest Service of a plan of selective cutting to prolong the life of the present lumber industry and to protect employment, completion of a physical land classification and a social-economic inventory to determine the best uses of various types of cut-over land.

In concluding its report, the Committee said:

"The problems of the Region, though aggravated and intensified by the recent depression, existed before 1929. They demand prompt and effective solution in order to effect the desirable rehabilitation of the Region and to avoid greater retrogression. The Region is worth rehabilitating. It goes without saying that the local people should help themselves, but the states and the nation have enough of a stake in the region to make it worth while to lend a hand. Most of the machinery to do the job is now set up and in motion. It should be kept moving."

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PARK CONFERENCE

The Third National Park Conference has been announced by The American Planning and Civic Association, to be held at Santa Fe, New Mexico, October 8-10, 1939. National Park officials are participating in the meeting, which is to be followed by a thousand-mile motor tour of the Southwestern National Parks and Monuments. The Conference and tour are being planned largely to give those who attend a clear-cut idea of the aims and accomplishments of the National Park Service. The Southwest is one of the most alluring and picturesque sections of the United States and The American Planning and Civic Association is extending a cordial invitation to all interested people to attend the sessions of the Conference. Write to the Association at 901 Union Trust Building, Washington, D. C., relative to rates and transportation.

Tree Dwellers

(*Continued from page* 457)

"paint" the smooth bark of our beeches or hollies with different shades of gray or pink, spotted with minute dots of black.

The plants mentioned here are but a few of the *epiphytes* of the world. Nature works in a mysterious way her wonders to perform, and a ramble through the woods now and then will help us all to understand these wonders and to appreciate natural beauty.

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TREE EXPERT OR QUACK?

SOME years ago I happened to notice a man busily engaged in some mysterious operations on the base of a large healthy elm tree. Being considerably interested, I stopped to investigate. The operator explained that he was a "tree doctor" and was injecting a secret formula into the tree which he said was "sick." This marvelous elixir was supposed to kill any insects or diseases now attacking the tree, or which might attack it in the future.

When he learned of my interest in the care of trees, he reluctantly exposed the secret formula to me. The material was revealed as a paste, composed of cow dung and wood ashes which was pressed into an auger hole previously bored into the tree. The practitioner was quite aware of the utter lack of value of such treatment, but he boasted that he had treated a large number of trees in the town in a similar manner—at considerable expense to the owners thereof and a large profit to himself. Probably seeing signs of potential rascality in me, he offered the privilege of following in his footsteps, provided I performed my miracles outside of his bailiwick.

It is hard to realize that in this enlightened day such ignorant practices can exist in competition with intelligent methods of tree preservation. But similar conditions do exist, in spite of research laboratories, experimental stations, tree wardens, and legal restrictions in some states. A glib tongue and a forceful personality have been responsible for the needless expenditure of hundreds of thousands of hard-earned dollars on trees with no resulting benefit and, as a matter of fact, considerable actual harm.

While some ministrations of quacks, although worthless, do not actually damage trees, in many cases definite injury or death occur after treatment.

Whenever there is an increased interest in a subject, there are always unscrupulous individuals who seize on such a golden opportunity to prey upon unsuspecting "John Public" at his expense and later regret. This phenomenon has already made itself manifest in connection with the growing interest in trees in this country.

The trees of some states and cities are fairly well protected by regulation. In such states and municipalities the would-be operators must pass an examination in tree care and secure a license before they can professionally administer to tree ailments. Such restrictions are far too few and in many cases, it must be confessed, are not too stringent in requirements. A fertile field of endeavor for garden clubs, shade tree protective associations, and other organizations lies in sponsoring such legislation as will assure more communities and states of satisfactory supervision and control over shade tree operators.

"But," you ask, "how am I to distinguish between the real expert and the quack?" Of primary importance to you is the reputation and experience of the organization which you call in for advice concerning your trees. If such a reputation is based upon actual beneficial results over several years among your neighbors; if the representative appears to be thoroughly trained and conscientious; it is usually reasonably safe to depend on such advice as may be given.

Although tree preservation work has been carried on for hundreds of years, present day methods are comparatively new and are being constantly changed and improved. It is important, therefore, that the organization or individual to whom you entrust your trees be familiar with the newest methods of diagnosis and treatment. The trained and conscientious arborist knows and practices the procedures called for, while the ignorant or dishonest quack probably does not even know of them—much less obeys them.

As in the case of medicine, correct diagnosis is a large part of the battle. For this reason, more and more college-trained arborists may be found in the tree service field. A knowledge of the basic sciences as taught in forestry and agricultural colleges, combined with years of practical training and experience, enables the trained arborist to accurately diagnose tree symptoms and prescribe proper treatment.

If you are in doubt about whom to consult concerning your trees, your local city forester, tree warden, park superintendent, state agricultural stations, forestry colleges, or the officers of shade tree conferences are usually willing to advise you as to someone nearby whose advice may be followed with safety.

If you wish to rely on your own judgment, make sure the recommendations made to you are satisfactory in the light of the following questions:

Does the representative appeal to you as a man who knows and loves trees and

A. Robert Thompson

Is expensive work recommended on a tree of doubtful value? Such treatment should be questioned seriously

whose word is locally respected? Has he had basic training and experience, or is he simply a salesman who knows a little about trees and who is trying to make a living out of that meager knowledge.

Is he conservative in his remarks, or does he "know it all"? The more a man studies a subject the more he realizes how little he actually does know and the less positive and radical he is apt to be.

Does he represent a reputable organization of established reputation and standing, or is he a "fly-by-night"?

Does he knock his competitors and their methods? Such a man is not apt to have much professional standing.

Is he willing to give you a written guarantee on the work performed?

Do his recommendations call for the greatest good to the greatest number of your trees, or does he recommend expensive work on individual trees of questionable merit? And last but not least, will the trees warrant the expenditure called for from a standpoint of permanent value or longevity of the trees?

When considering tree preservative work, it is important to remember that preventive measures are equally if not more important than corrective ones. Among the recommendations which might be made to you, and which are often justified, might appear the following types of service. By no means do all trees need all of these ministrations, but many do need some attention and need it badly:

Fertilization — for trees showing signs of malnutrition; bracing — to support weak limbs and crotches; spraying—when insects or leaf diseases infest or threaten your trees; pruning — to remove dead wood or shape the trees; lightning protection—for valuable large trees; root treatment—for trees suffering from girdling roots, root rots, compaction or gas injury; wound treatment—if the expense is warranted by the value of the tree. Other types of treatment may be indicated by local symptoms and no general rules can be given for such cases due to their wide variation.

Additional checks upon the caliber of the operator will come to the mind of the careful tree owner, but one additional thought should be expressed. In these days of enforced economy, the temptation is to engage the cheapest service available. This is more often than not a very short-sighted policy, for you usually get just about what you pay for in tree service, as in other lines of endeavor.

Congress Gets Forest Restoration Plan

(*Continued from page* 458)

farmer to go still deeper into debt and that its overhead operation by the federal government would be excessive and a burden upon the taxpayer.

From another section of the country critical comment came from John Woods, secretary-manager of the Oregon Forest Fire Association. In a letter to his members, Mr. Woods said:

"While it appears reasonable for the federal government to devote large amounts of relief money to employing labor to replant trees on forest lands, private as well as public, this bill goes much farther than that and is obviously intended to give the federal Forest Service absolute control over private forestry in the United States. Industry should be concerned with the fact that this bill would authorize the federal government to log and sell private timber, and at its option to manufacture such logs into lumber or any other desired product, and to sell such output in the market.

"In the past industry has fought off repeated efforts by the Forest Service to obtain authority from the Congress to log national forest timber in competition with private operators. This proposal would put them in the same business on private lands."

Fire Fighters' Memorial

A FIRE Fighters' Memorial, erected in honor of fifteen men who lost their lives in the Blackwater fire on the Shoshone National Forest, Wyoming, was dedicated on August 20, the second anniversary of the fire. The Memorial is located at the junction of Blackwater Creek and the north fork of the Shoshone River. It is adjacent to the Cody-Yellowstone Road on U. S. 20, thirty-six miles west of Cody, in the Shoshone Forest.

The monument has been constructed by the Civilian Conservation Corps during the past year, and has just been completed. It is a massive natural stone structure, with an over-all length of seventy-one feet. Steps lead up to the monument proper, which is forty-three feet in length and rises slightly over six feet above the ground line. On the rear of the monument is a bronze plaque four by two feet in dimension, on which is inscribed a description of the fire.

The dedication was sponsored jointly by the Forest Service and the American Legion.

The American Forestry Association Fire Medal for heroic services at the time of the fire was awarded to Bert Sullivan, of Cody. The citation was made by Tom Gill, Secretary of the Charles Lathrop Pack Forestry Foundation, of Washington, D. C. A similar medal was presented to Ranger U. J. Post in March.

After the dedication a smaller party went by saddle horse to Clayton Gulch, about nine miles from the monument, to dedicate a marker which is being erected at the place where Ranger Alfred G. Clayton and Foremen James T. Saban and Rex A. Hale and five enrollees were burned to death. The marker, of rough stones, contains the metal portions of tools and equipment which were dropped by the fire victims.

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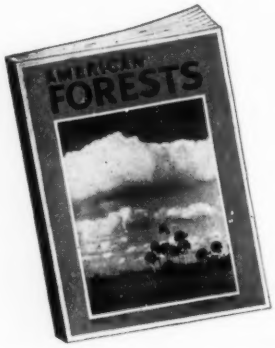

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CONSERVATION CALENDAR

Important Bills in Congress with Action July 13-August 16, 1939

BILLS ENACTED

S. 26—WHEELER—To empower the President to create new national forest units and make additions to existing national forests in Montana. Passed Senate February 16, 1939. Passed House July 14, 1939. Approved July 20, 1939.

S. 770—WHEELER—To authorize an addition to Glacier National Park in Montana for the establishment and operation of a fish hatchery. Passed Senate July 6, 1939. Passed House amended July 17, 1939. Approved July 31, 1939.

H. R. 6503—MOTT—Relating to the exchange of certain lands in the State of Oregon. Passed House July 6, 1939. Passed Senate July 18, 1939. Approved July 31, 1939.

H. R. 2990—To extend the Civilian Conservation Corps to July 1, 1943, and provide an official seal for the Corps. Passed House August 1, 1939. Passed Senate August 1, 1939. Approved August 7, 1939.

H. R. 2752—LEAVY—To include within the Kaniksu National Forest certain land owned or in course of acquisition by the United States. Passed House July 6, 1939. Passed Senate August 1, 1939, amended. Signed by the President August 10, 1939.

H. R. 3409—NORRELL—To amend the act of June 15, 1936, authorizing the extension of the boundaries of the Hot Springs National Park in Arkansas. Passed House July 6, 1939. Passed Senate August 2, 1939. Signed by the President August 10, 1939.

H. R. 6634—WHITTINGTON—Amending previous flood control acts and authorizing preliminary examinations and surveys for flood control. Passed House July 6, 1939. Passed Senate August 1, 1939. Signed by the President August 11, 1939.

S. Res. 160—Directing the Tariff Commission to investigate the facts concerning domestic production and importation of wood pulp or pulpwood. Resolution amended and agreed to August 1, 1939.

H. R. 5747—To authorize the addition of certain lands to the Wenatchee National Forest. Passed House July 6, 1939. Passed Senate August 1, 1939. Signed by the President August 11, 1939.

S. 2046—RADCLIFFE—To change the designations of the Abraham Lincoln National Park in Kentucky, and the Fort McHenry National Park in Maryland. Passed Senate August 1, 1939. Passed House August 5, 1939. Signed by the President August 11, 1939.

H. Res. 284—DEROUEN—Resolution authorizing a survey and study of the national parks, national monuments, and national shrines. Introduced on July 31, 1939. Passed House August 4, 1939.

S. 1802—Authorizing construction of water conservation and utilization projects in the Great Plains and arid and semi-arid areas of the United States. Passed Senate August 1, 1939. Passed House August 4, 1939. Signed by the President August 11, 1939.

S. Res. 170—SHIPSTEAD—Resolution authorizing an inspection of Rainy Lake watershed by a subcommittee of the Committee on Foreign Relations. Introduced July 24, 1939. Passed Senate August 4, 1939.

H. Res. 163—Regarding an investigation of Alaskan Fisheries. Passed House August 1, 1939.

S. 2237—To amend Taylor Grazing Act providing for Advisory Board of local stockmen in each district to be known as the grazing district advisors. Passed Senate June 13, 1939. Passed House July 6, 1939. Approved July 14, 1939.

BILLS VETOED

S. 6—HAYDEN—To return a portion of the Grand Canyon National Monument to the public domain. Passed Senate July 18, 1939. Passed House July 31, 1939. Vetoed August 7, 1939.

S. J. Res. 160—To provide for the maintenance for public use of certain highways in the Shenandoah National Park. Passed Senate August 1, 1939. Passed House August 4, 1939. Vetoed August 9, 1939.

H. R. 3959—To authorize the Secretary of the Interior to dispose of recreation demonstration projects and for other purposes. Passed Senate with amendments on August 3, 1939. House agreed to Senate amendments August 4, 1939. Vetoed by the President August 11, 1939.

S. J. Res. 139—Joint resolution to authorize compacts or agreements between or among the states bordering on the Atlantic Ocean with respect to fishing in the territorial waters and the bays and inlets of the Atlantic Ocean on which such states border, and for other purposes. Vetoed by the President August 11, 1939.

BILLS PENDING

S. 1108—HOLMAN AND SCHWELLENBACH—To restrict the exportation of certain Douglas fir peeler logs and Port Orford cedar logs. Passed Senate July 18, 1939. Referred to the House Committee on Ways and Means July 20, 1939.

H. R. 7271—FULMER—To authorize the Secretary of Agriculture to enter into cooperative agreements or leases with the owners of forest lands in order to provide for their management in accordance with proper forestry practices. Introduced July 18, 1939. Re-

ferred to the Committee on Agriculture. Companion bill in Senate, S. 2927—WALSH, BROWN and LAFOLLETTE. Introduced on July 31, 1939. To Senate Committee on Agriculture and Forestry.

H. R. 7505—BOYKIN—A bill to amend the Merchant Marine Act, 1936, as amended, to provide for extending aid to producers of lumber and manufactured timber products. Introduced on August 4, 1939. To the Committee on Merchant Marine and Fisheries. An identical bill introduced on August 2, 1939, by Representative Angell and referred to same committee—H. R. 7463.

H. R. 884—MOTT—To add certain lands to the Siuslaw National Forest in Oregon. Reported with an amendment (Report No. 1238) by the Committee on Public Lands July 21, 1939. Passed House July 31, 1939. S. 929 reported to Senate August 1, 1939, with amendments (Report No. 1044).

H. R. 2418—PIERCE (Oregon)—To extend the provisions of the Forest Exchange Act, as amended, to certain lands, so that they may become parts of the Whitman, Malheur, or Umatilla National Forests. Passed House July 31, 1939.

H. R. 5404—PIERCE (Oregon)—To extend the provisions of the Forest Exchange Act, as amended, to certain lands so that they may become part of the Ochoco National Forest, Oregon. Passed House July 31, 1939.

S. 2960—BORAH—A bill to add certain lands to the St. Joe National Forest, Idaho, in order to protect the watershed of the town of St. Maries. Introduced on August 4, 1939. Referred to the Committee on Agriculture and Forestry.

S. Res. 147—ASHURST—Authorizing the Committee on Public Lands and Surveys to make a thorough investigation of all questions relating to the proposed enlargement of Rocky Mountain National Park. Reported without amendment by the Committee on Public Lands and Surveys and referred to the Committee to Audit and Control Contingent Expenses of the Senate July 18, 1939. Reported to Senate without amendment August 3, 1939.

S. 2493—BYRD—To provide for the operation of the recreational facilities within the Chopawamsic recreational demonstration project near Dumfries, Virginia, by the Secretary of the Interior. Reported without amendment (Report No. 849) by the Senate Committee on Public Lands and Surveys July 18, 1939. Passed Senate August 1, 1939.

H. R. 3794—GEARHART—To establish the Kings Canyon National Park in California and to transfer thereto the lands now included in the General Grant National Park. Passed House amended July 18, 1939. Referred to the Senate Committee on Public Lands and Surveys July 19, 1939. Reported to Senate without amendment August 3, 1939 (Report No. 1134).

H. R. 7272—MONRONEY—To add certain land to the Platt National Park in Oklahoma. Introduced July 19, 1939. Referred to the Committee on the Public Lands.

H. R. 2315—To provide for the addition of certain lands to the Vicksburg National Military Park, in the state of Mississippi, and for other purposes. Passed House July 31, 1939.

H. R. 7532—BARDEN—A bill to authorize the Secretary of the Interior to acquire property for Moores Creek National Military Park, and for other purposes. Introduced on August 5, 1939. Referred to the Committee on the Public Lands.

S. 2625—ADAMS—To authorize the Secretary of the Interior to sell or otherwise dispose of surplus animals inhabiting the national parks and national monuments. Passed Senate August 1, 1939. Referred to House Committee on Public Lands August 5, 1939.

S. 2270—An act to authorize the Secretary of Agriculture to purchase refuge lands in South Carolina for the perpetuation of the eastern wild turkey and to provide pure-blood brood stock for restocking within its native range, and for other purposes. Passed Senate August 1, 1939. Referred to House Committee on Agriculture August 5, 1939.

H. R. 4985—To provide for a Fishery Education Service in the Bureau of Fisheries. Passed House July 31, 1939.

S. 2958—MEAD—A bill to provide for establishing five regional agricultural research centers, for investigations and demonstrations in self-sufficing farming, the preservation of plant and animal varieties for use in event of outbreaks of new diseases or development of new commercial uses, suburban land use, and the application of power-driven appliances on the self-sufficing farm and in the farm home. Introduced on August 4, 1939. Referred to the Committee on Agriculture and Forestry.

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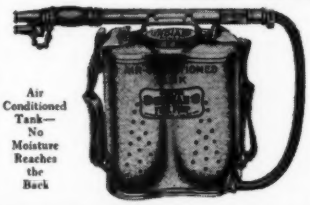

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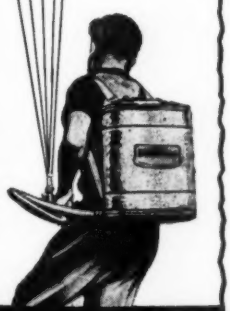

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A BOOK OF WILD FLOWERS, by Margaret McKenny and Edith F. Johnston. The Macmillan Company, New York City. 90 pages. Illustrated. Price $2.00.

A charming little book—not a wildflower guide or manual but a bouquet of some of the flowers which make each season lovely and to be remembered. The simple text is embellished by beautiful flower paintings made by Edith Johnston and reproduced, lithographically, in full color. A book to delight children of all ages—from six to sixty.

FOREST INSECTS, by R. W. Doane, E. C. Van Dyke, W. J. Chamberlin and H. E. Burke. Published by the McGraw-Hill Book Company, New York. 463 pages. Illustrated. Price $4.50.

As part of the American Forestry Series, this book is especially designed for the use of students in forest schools, colleges and universities, and for forest workers. Chapters deal with the importance of forest entomology; the control of forest insects; the whole family of beetles; the moths and butterflies; aphids, scale insects; termites or white ants. An ideal book not only for the student, but for many others in need of reliable information on this subject.

LAND OF HIGH HORIZONS, by Elizabeth Skaggs Bowman. Published by the Southern Publishers, Inc., Kingsport, Tenn. 212 pages. Illustrated. Price $2.50.

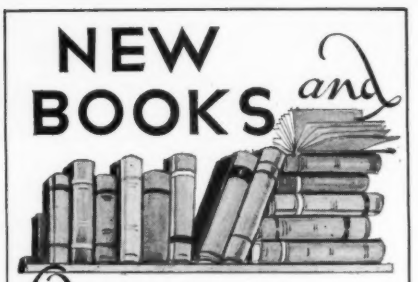
Here one finds a presentation of plain tales from the mountains of North Carolina and Tennessee with a faithful recording of events which have led to the creation of the Smoky Mountain National Park. Of special interest to many is the chapter on the geology of the region and the chapters reviewing the unfortunate history of the Cherokee Indians.

WILDFOWL FOOD PLANTS, by W. L. McAtee. Published by the Collegiate Press, Inc., Ames, Iowa. 141 pages. Illustrated. Price $1.50.

This book comments on all wildfowl food plants of both general and local importance, summarizes information on methods of propagating them, discusses the principal environmental factors affecting the plants, and ways in which some of them can be managed by man for his own purposes and the benefit of the birds.

NATIONAL PARKS OF THE NORTHWEST, by Martelle Trager. Published by Dodd, Mead and Company, New York City. 216 pages. Illustrated. Price, $2.50.

An American mother tells how she and her family traveled through seven national parks of the northwest. As the wife of a National Park Service official, Mrs. Trager had an unusual opportunity to learn the interesting features and intimate history of each of these national parks. She tells these in an entertaining way, including much that will be helpful to other travelers who may follow all or part of her itinerary. With the pages in the back of the book giving details of each national park, it has many elements of a handbook as well as a guide.



A list of Selected Books on Forestry and related fields of Conservation is available to members of The American Forestry Association on request. Books on this list—as well as other books—may be purchased at a discount of ten per cent from published prices if they are ordered through the Association.

THE LOG OF TANAGER HILL, by Marie Andrews Commons. William & Wilkins Co., Baltimore, Maryland. 244 pages. Illustrated. Price $2.50.

In diary form, delightfully written, this book is an accurate day by day record of bird-banding activities for eight years, done by two people who loved and knew birds and found the painstaking work keenly interesting. The most meticulous care was taken to avoid injury and casualties in both the trapping and banding, daily records were conscientiously kept and out of these records grew Mrs. Commons' unusual book.

WILD COUNTRY—Creatures of Island, Mountain, Sea and Moor. By F. Fraser Darling. The Macmillan Company, New York and Cambridge, at the University Press. 103 pages. Illustrated. Price $2.75.

This book is largely made up of beautiful photographs of scenery and wildlife, beautifully made, on a biologist's holiday. Dr. Darling takes a field trip on which, in natural circumstances, he photographs seals, sandpipers, gulls and other birds in flight, deer, waves, rocks, mountains, flowers and—fairies! He understands animal behaviour, and his comments on his pictures, rising out of his scientific training and his love of Scotland, are perfect.

THE PACIFIC NORTHWEST, published by Northwest Regional Council, Portland, Oregon. 456 pages. Price $3.00.

This is a selected bibliography from 1930 through 1939, including complete research in the natural resource and socio-economic fields, together with an annotated list of "in-progress" and contemplated research, in the stimulation of a greater public awareness of the basic problems of the Pacific Northwest—one of the declared purposes of the Council and to which its work is dedicated.

Principles of Gully Erosion in the Piedmont of South Carolina, by H. S. Ireland, C. F. S. Sharpe and D. H. Eargle. Soil Conservation Service, U. S. Dept. of Agr. Tech. Bul. No. 633. Supt. of Docs., Washington, D. C., price 65 cents.

Forest Resources of Southwest Louisiana, by James W. Cruikshank. Progress Report by the Southern Forest Survey, Release No. 43. Sou. For. Expt. Sta., New Orleans, La.

The Extent of Long-Term Tax Delinquency in Certain Oklahoma Counties, by Ronald B. Craig. Occasional Paper No. 80. Sou. For. Expt. Sta., New Orleans, La.

Forest Resources of Central Georgia, by A. R. Spillers. Progress Report of the Southern Forest Survey, Release No. 41. Sou. For. Expt. Sta., New Orleans, La.

Forestry Resources of the South Louisiana Delta, by R. K. Winters. Progress Report, Southern Forest Survey, Release No. 42. Sou. For. Expt. Sta., New Orleans, La.

Must All Rare Plants Suffer the Fate of Franklinia? by M. L. Fernald. Reprinted from the Journal of the Franklin Institute, Vol. 226, No. 3, September, 1938.

The Inspection, Certification and Transportation of Nursery Stock. New York Departments of Agriculture and Markets, Circular No. 659. Albany, N. Y.

State Conservation of Resources, by Clifford J. Hynning. A Study made for the National Resources Committee. Supt. of Docs., Washington, D. C., price 15 cents.

Forest Resources of Southeastern Texas—by J. W. Cruikshank and I. F. Eldredge. Southern Forest Survey. Dept. of Agr. Mis. Pub. No. 326. Supt. of Docs., Washington, D. C., price 20 cents.

Timber Requirements of the Hardwood Distillation Industry—based on a report submitted by M. H. Haertel. A Progress Report of The Forest Survey. U. S. Forest Service, Washington, D. C.

Federal Relations to Research—National Resources Committee. Supt. of Docs., Washington, D. C., price 10 cents.

Forest Development on the Goulais River Watershed 1910-33, by J. W. B. Sisam. Silvicultural Research Note No. 55, Lands, Parks and Forest Branch of the Canadian Department of Mines and Resources, Ottawa, Canada.

Hands to Save the Soil—The Civilian Conservation Corps, collaborating with the Soil Conservation Service. Government Printing Office, Washington, D. C.

Tree Trimming Equipment — Bartlett Manufacturing Company, Detroit, Michigan.

Marketing Forest Products in New Hampshire—by George M. Hopkins. Published by the New Hampshire State Planning and Development Commission, with the cooperation of the Society for the Protection of New Hampshire Forests.

ASK THE FORESTER

Forestry Questions Submitted to The American Forestry Association, 919 - 17th St., N. W., Washington, D. C., Will Be Answered in This Column. . . . A Self-Addressed Stamped Envelope Should Accompany Your Letter.

QUESTION: How many acres of forest are necessary to produce the paper for one Sunday edition of a large metropolitan paper?—K. G., Washington, D. C.

ANSWER: The area varies in accordance with the volume of timber and the size of the Sunday edition. The *New York Times* will require the growth on forty to eighty acres, while to furnish the seventy tons for a Sunday edition of the *Washington Post* will require around fifteen acres.

QUESTION: What is the difference between poison ivy and poison oak, and what treatment can be used for the poison?—J. S., Illinois.

ANSWER: Poison ivy and poison oak are forms of the same plant. The leaves are always divided into three leaflets, dark and usually shiny green on the upper surface. The berries or fruit are whitish and waxy, somewhat like mistletoe berries. All poison ivy plants do not have berries but all have three leaflets to each leaf. Poison oak has leaves shaped more like oak leaves.

After exposure to either of these poison plants, wash the exposed surfaces of skin as promptly as possible with hot water and strong soap containing excess alkali. Make a heavy lather, rinse off completely, and repeat three or four times. Give the hands special attention, particularly the fingernails and the tender skin between the fingers, but do not scrub with a stiff brush as that may rub in the poison.

QUESTION: How many national forests are there and what is their total area?—K. G., Washington, D. C.

ANSWER: The 158 national forests contained a net area of 175,238,168 acres on June 30, 1938. In addition, the National Forest Reservation Commission has formally approved thirty-seven additional Purchase Units. When the land within these Purchase Units is acquired by purchase or otherwise, the total area of the national forests will exceed 227,000,000 acres.

QUESTION: Do most Jack pine seeds which are scattered in July and August germinate promptly, or are they likely to remain dormant until the following spring?—R. A. B., Minnesota.

ANSWER: In a field study conducted on the Superior National Forest, it was found that where moisture conditions were favorable, Jack pine seeds germinated actively whenever the maximum air temperature exceeded 64 degrees Fahrenheit. At Ely, Minnesota, this period extends roughly from May 10 to October 1. Where moisture conditions are unfavorable very few seeds germinate until the following May when the high moisture content caused by the recently melted snows and spring rains keep the ground moist for a long enough period to permit active germination.

QUESTION: Are all positions in the Forest Service under Civil Service?—B. H., Pennsylvania.

ANSWER. This is generally true of all permanent positions. With the President's order of June 24, 1938, it is now possible to grant Civil Service status to seasonal employees such as fire guards, telephone operators, field assistants, administrative guards, recreational guards, fire prevention officers and scalers. Those who were on the rolls on June 24, 1938, are eligible for Civil Service status, providing they have rendered satisfactory service for six months or more.

QUESTION: Why are there no coniferous trees other than red cedar in the Silurian limestone area around Cincinnati?—F. E., Ohio.

ANSWER: The Central States Forest Experiment Station has found that seed of the yellow pines do not germinate in soils containing large amounts of calcium. This may apply to the seed of other coniferous trees adapted to this region and so explain their absence.

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Ties for the Rails of India

(*Continued from page* 461)

The deodar forests are generally some thousands of feet above the nearest river, with the intervening ground a jumble of cliffs. In the early days each tie was carried laboriously down rough paths on a man's back, but later a simple but effective gravity ropeway was evolved. It is built of three track ropes of light steel cable, one inch in circumference, which are stretched over a guillotine frame at top and bottom and pulled taut on a primitive windlass of tree trunks and poles. The load of two or three scantlings is hitched to three small pulley wheels which travel on these track ropes. Control is applied through an endless cable which runs around a wheel mounted at top and bottom; the load is hitched to this moving rope, and a band-brake on the wheel checks the downward pace of the load as it sails off downhill.

A series of two or three spans running between prominent points will carry the whole output from one block of forest across even the most difficult ground, and all goes well unless the control rope breaks, when with a wild warning scream the load hurtles down along its track ropes at a tremendous pace, scattering like matchwood the crib of ties built up to serve as a landing stage at the bottom. The ropeway workers know that sound and take cover in record time.

Where side-streams can be used for floating, the timber is worked down over telescopic slides, the rough mountain torrent bed being paved with ties laid herring-bone fashion while the rest of the timber is worked down over them. On their arrival at the larger river they are set adrift on the current, but sudden floods may lodge the timber in awkward and inaccessible crevices, while a drop to winter level may spoil the freeway, because Himalayan rivers have a disconcerting habit of disappearing under boulder bridges in the upper part of their course. The work cannot therefore be delayed, and requires a deal of skill and courage from those who follow this very specialized trade of timber floating.

Wilderness Resurgent

(*Continued from page* 462)

sive to simple facts and happenings around them. Life seemed good; they were alive to it, and fascinated.

Human associations of stirring interest surround the abandoned homesteads now succumbing to the forest, and persons familiar with the old life in the mountains cannot help a feeling of regret as they contemplate its passing. Nevertheless, if they appreciate the proper use of land, they must be glad to see the movement of families down from the natural wilderness domain. It is gratifying today to see clearings on steep slopes springing up in trees, to know that people have left isolated situations where they could not better a meager existence, or their children learn to cope with modern conditions. These magnificent mountains need the unbroken forest cover—for the health of the streams and rivers, for the building up of depleted animal life, for the inspiration of wild beauty, for continuing all-round benefits to the millions of people touched by their manifold influences.

Over-zealous settlement in the Southern Appalachians created a brave human story, and one that will be remembered, but it violated the dictates of wise land stewardship. Americans will approve its spirited sequel, the restoring advance of a resurgent wilderness marching in step with progress toward the rightful shape of things, for the long-time good of earth and people.

Filming the Golden Eagle

(*Continued from page* 449)

pine dangling crosswise in her beak. But she flushed after ten feet of film had been exposed. Half an hour later she returned. This time the cameraman remained motionless—but the eagle eyed the blind a moment and again flew away. She returned and started feeding the young, but once more the camera frightened her. This little drama was repeated again, this time with the male swinging in along the ledge. Then both adult birds sailed away. Four hours in the blind, and only ten feet of film!

Six days later we tried again. The prairie had changed from brown to green and the alders and willows were tinged with the color of breaking leaves. There were many new bird calls, the dull undertone of mourning doves being the characteristic note along the ledge. Through a peep hole in the blind adult eagles could be seen cruising along the opposite canyon wall. They would alight on the yellow pine stub, black against the morning light, and then dive into space, circling and rising higher and higher in the air until they appeared as mere dots. Suddenly one of the birds folded its wings and dropped straight downward, to straighten and land directly on the ledge.

The changes we had made in the nest proved worthwhile. The female landed broadside to the camera, inspected the blind rather leisurely, then walked to the center of the nest and fed the young with bits of meat torn from an unfortunate rabbit. At last our endurance contest was over. In spite of the motion camera, she continued her care of the young, giving us all the footage we desired for the time being.

It was not until May 19 that we again called on our birds. Now the world was green, the trees were in full leaf and the prairie was dotted with mertensia, calendula, pentstemon, and prairie primrose. Canyon wrens were in full song, their melodious notes running down the scale; the doves were still droning their lonesome calls, and our baby eagles were still in their nest. There was a change in our youngsters, however, evident before we saw them. No longer did they utter cries like baby chicks; instead they gave shrill, strident notes, not unlike the adults. And instead of begging for food, they demanded it, with petulant voices used only by badly spoiled children.

As the young were large, they no longer needed attention for hours at a stretch, and the parents contented themselves with cruising by occasionally. They landed upon the nest twice but no pictures were secured. The following day another attempt was made—but still no pictures.

Indeed, we had no photographic results for the last ten hours spent in the hiding place, and were forced to conclude, somewhat reluctantly, that our old birds did not intend to cooperate with us. And so ended a season with the golden eagles. We had been somewhat of a trial to them, disturbing them often as they tried to go about their household affairs. Our photographic results were not satisfactory, but at least we had made a start toward filming the nesting activities of these fine birds of prey.

Primitive Forests—Their Geologic Record

(*Continued from page* 444)

jammed, and sunk by waterlogging, although there is definite evidence that many grew on the present site. The sand and mud that naturally came entombed the logs in sediment.

Even after the sea withdrew and the land was slowly elevated, the sandstone and shale, hardened from the deposited sand and mud, protected the logs from the ravages of decay. Percolating underground waters dissolved some of the siliceous sandstone and used it to replace molecule by molecule the wood of the buried logs. Thus the trees were petrified, many in great perfection, clearly retaining their bark, annual rings, and cellulose structure. Subsequent erosion exposed the long-concealed logs, and most of them rolled at least a short distance into a shallow arroyo, where they are today. Others are several hundred feet higher up on the mesa walls, portions of them still buried in their old sandstone graves, but with their ends protruding, indicating to geologists the site of their origin.

The specimens are all conifers of the Araucarian family and have been described as *Araucarioxylon arizonicum* and *Woodworthia arizonica*, the former species being much the more abundant. The araucarians are not now native to the Northern hemisphere, but they are represented today by the Brazilian Pine (*Araucaria braziliana*) and other species in Australia, including the Norfolk Island Pine (*A. excelsa*), which is occasionally cultivated in this country.

From the standpoint of completeness of araucarian record, however, the Arizona forest must surrender some of its laurels to the Cerro Cuadrado fossil forest in Patagonia, also of Triassic age. Here may be found not only petrified prone trunks and branches but also standing stumps, seedlings, and cones, (Proaraucarian) all preserved in quartz. These fossils are of rare beauty and scientific interest. That the type was extremely persistent is evidenced by the fact that today, 180 million years later, araucarians are thriving in living forests not very far away from their aged, now petrified, brothers of the Cerro de Cuadrado.

Of course the araucarians were not the only forest builders of this age. Some of the other swamp trees still survived, being especially well preserved in the Richmond coal basin of Virginia, though this Triassic period and the similar Jurassic which followed were characteristically arid, extensive deserts drying up and replacing most of the coal swamps. It was on the dry uplands where grew the araucarians and other more scrubby conifers, and various species of sago-palms (*Cycadaceae*) flourished all over the world from America to China and from Alaska to the Antarctic. Specimens of the last are very well preserved in the rocks of this and the next geologic period, notably in the petrified forest in the Black Hills of South Dakota, now set aside as the Cycad National Monument.

There was one other interesting tree that was abundant during the Jurassic—

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interesting because it is the oldest tree now living, in the sense that it has come down to our time through millions of years with little or no apparent change. This is the *Ginkgo* or maidenhair tree, so named because its leaves resemble the common maidenhair fern. Some fossil beds have yielded beautiful specimens of *Ginkgo* leaves. These fossils are of special interest in that they consist not just of impressions in the rock but the well-preserved original leaves! The tree is represented today by just a single cultivated species (*Ginkgo bilboa*) which grows around Oriental temples in China and Japan. The tree has been transplanted to this country and has proved quite hardy. In many cities it is a favorite for shade tree use. One is now growing beside an appropriate marker at the Oregon fossil site, providing a vivid example of a tree that has so long successfully defied the dictums of evolution.

The close of the Jurassic rang down the curtain on the strange forests of the past. With the coming of the Cretaceous (meaning "chalky" after the famous cliffs of this age that flank the English Channel) appeared in conspicuous numbers the deciduous trees common today, such as the magnolia, sassafras, and poplar. Late in the Cretaceous, the beeches, birches, maples, oaks, walnuts, sycamores and many others made their debuts. This did not mean, however, that the present was at hand, for the earth had yet to make about eighty million more annual pilgrimages around its sun before man could ring in 1939.

Among the geologically recent forests of stone are the petrified forests of Yellowstone National Park. These once living stands of timber were rained upon and buried by volcanic ash, an excellent fossil preservative. Volcanic outbursts came spasmodically, each interval long enough to allow mature growth; so at one place in the park, Specimen Ridge, stumps of no less than twelve successive forests stand one above the other. Some of the Yellowstone stumps reach up into pillar-like trunks that are thirty feet high, a remarkable height of preservation in spite of the fact that the trees were thrice as high in life. Fully ninety-five per cent of the fossil wood is petrified from three conifer species, viz., magnificent redwood, Aldersons pine, and amethyst pine. The rest are oaks, sycamores, aromatic bays, and laurels.

Many forests, then, have sprouted, grown, dallied for a moment, and vanished into oblivion. Of their long history the rocks have recorded a few tattered pages—Gilboa, the Carboniferous, Arizona, Cerro Cuadrado, the Black Hills, Yellowstone, and others—but these are enough to give us at least a bird's-eye view of forest evolution, at least some understanding of the age-long development of microscopic plant-life into the mighty forests of today.

Control of Little Waters in North Africa

(*Continued from page* 455)

a distance of twenty miles about Timgad.

The evidence would indicate that during Roman times detailed attention was given to works of water control and conservation, and further that the slopes about Timgad were covered with a forest of olive trees, and that the valley floor was cultivated to grains, chiefly wheat and barley. Now the land about ancient Thamugadi (Timgad) is in ruins. Soils have been washed from the slopes, leaving them naked. Gullies cut down through the land; they even cut down through the ruins of the city to depths below the foundations of the ancient structures. The valley floors are swept clean of fine soil by wind except where a layer of erosion pavement breaks the wind's force. They are cultivated to barley in the primitive ways of the Arab. When rain falls in the winter the Arab farmer sows his barley seed over the unprepared ground and then plows up the area, covering the seed more or less. Gullies are still cutting down through these soil oases in the valleys. It is much more of a task to restore the land than to restore the city.

At Tebessa, a hundred miles to the east of Timgad, we met Administrator Batistini, who accompanied us on a seventy-mile trip to the south over a desert "piste" (track) to see traces of check dams and terrace walls facing the Sahara Desert. Monsieur Batistini is the able administrator of the large Tebessa District, which includes the entire region of annual migrations of the local Arab clans. He has been conditioning the ancient water developments of the Roman epoch on the basis of archaeological evidence. Old Roman cisterns were visited which have been cleaned out and repaired and are now satisfactorily supplying water to the herds of the region.

There are more than sixty of these cisterns in the district, with capacities up to 28,000 cubic feet. Administrator Batistini had constructed a new cistern at R'der Safia with a capacity of 105,000 cubic feet. It was practically full of "sweet water" and is serving well the needs of local herdsmen.

After lunching with the Kaid, or chieftain of a local clan, at an administrative rest house of Bir el Ater, we proceeded to Djemidjema to find astonishing works of water control. These consisted of a series of check dams built to retard and divert storm run-off out along ditches to a flat slope.

We found these works located on the outwash slopes of an abrupt escarpment of upturned Tertiary thin-bedded sandstones, rising from 400 to 600 feet above the valley floor. The altitude of the outwash slope ranged from 2,400 to 2,600 feet. The slope drained southward into the oblivion of the mysterious Sahara. Standing on these slopes one could see to the southward the level but faintly purple horizon of the Sahara, like a mysterious sea. This abrupt escarpment doubtless

is the occasion for the downpour of local rains which yield unusually heavy run-off, as the large "wadies" or channels would suggest.

It was this run-off which farmers of long ago—or were they stockmen?—built check dams to retard and divert. They also built canals to lead the storm water around to the broad flat reaches of the slopes, and terrace walls to spread it and to catch the silt and hold it against erosion. The walls were placed so as to create a series of flat terraces stepping down the slope. Where necessary, cross walls were built to take advantage of the terrain. The walls consisted of a double row of large uncut stone placed about three or four feet apart and filled with earth and smaller stones. Many portions of the walls are still in a state of good repair and soil to a depth of two feet, though bare, still is held back.

One of the largest check dams, long since broken, was found to be about 110 feet long on the crest, and twelve feet high above the dry stream bed. Remnants of the dam, with its double walls of big tilted stones, were seen on each side of the valley.

Who built these fascinating works, or why, no one knows; they resemble works the writer has traced out near Safford, on the lower slopes of the Graham Mountains in the Gila Valley of Arizona. The retardation and diversion of storm run-off was surely the primary objective of the ancient and unknown inhabitants of this lonely area. Whether the works were built for irrigation of pasture, or for quick growing cultivated grains such as some of the African sorghums, which are not now sown in Northern Africa, is only a conjecture. Whatever may have been their original purpose, the check dams are being repaired and the ancient diversion canals cleaned out so as to divert and spread storm run-off to increase pasturage in this land of the Bedouin nomad.

Whether the climate has changed since the time of these works is a persisting question despite the conclusions of savants. The ancient Roman cistern at Mergrueb, some fifty miles south of Tebessa, yields some evidence. This cistern, located on a long gently sloping outwash fan, on which were built low dykes to guide run-off waters into it, was recently cleaned out and reconditioned in line with the present French policy in this district. It has a diameter of fifty-nine feet, depth of fourteen and a half feet, and a capacity of 28,000 cubic feet. It is also provided with a decantation basin, eight by ten feet, and four feet deep, to catch erosion debris, which was undoubtedly cleaned out after each storm. The cistern was provided with a spillway which was rebuilt to the ancient dimensions in the repairs.

Last year a thunderstorm occurred in the vicinity and yielded so much run-off that not only was the cistern filled, but the capacity of the Roman designed spillway was exceeded. The run-off exceeded the expectancy of the Roman design, whether from more torrential rains of the present epoch, or of a greater coefficient of run-off, or from the inclusion of a larger catchment area within the repaired collector dykes. This evidence is not conclusive, but it discounts the possibility of a reduction in rainfall since Roman times.

The Sbeitla area in southern Tunisia yields additional evidence of special interest. The Roman city, at the present site of Sbeitla, which is 100 miles southwest of Sfax and has a population of less than 1,000, was Sufetula, which had an estimated population of 100,000. The ruins have been excavated only in small part. Unnatural undulations and mounds of the land, walls and columns of ancient temples are evident. An amphitheatre, though covered with earth, is detected by an oval depression and fragments of the wall peeping through the surface. The ancient city covered several hundred acres and was an important center. It was supplied with water by large springs, the waters of which are now piped 100 miles to supply the thriving city of Sfax, in the center of a great plantation of olive trees.

Three miles to the west of ancient Sufetula lies a broad valley bordered by rather abrupt mountain walls. Check dams were built in the channels of the streams of the higher mountain range and terraces were constructed on which olive trees were planted to the summit. Works of diverting and spreading the run-off from the mountains may still be followed in the valley. The gently sloping valley floor is banded by generally straight bench walls. Cross walls were inserted to keep the land slope to a certain gradient.

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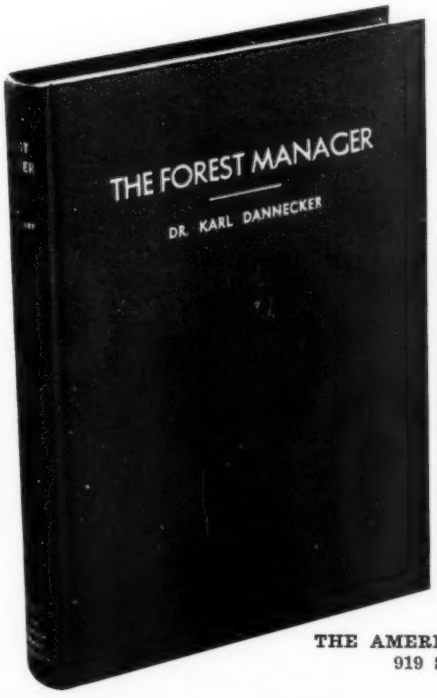

THAT owners of farm and other small forest holdings may have a better understanding of the management of their properties, The American Forestry Association has just published **THE FOREST MANAGER** by Dr. Karl Dannecker.

This book is a translation of a German forestry classic, describing the application of forest management to privately owned forest lands, based on years of experience in Germany.

THE desire "to help the farm woodland owner in his search for the knowledge necessary to handle his forest in an orderly manner" was the motivating idea of the author. **THE FOREST MANAGER** tells, for example, why the selection forest is both economical and profitable; why and how the natural forest form should be retained.

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Index to

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PAGE

American Telephone and Telegraph Company, The ... 2nd Cover

Bartlett Manufacturing Company ... 471

Beebe Brothers, Inc. ... 475

Blue Ridge Rhododendron Gardens ... 471

Caterpillar Tractor Company, The ... 435

Chelsea Hotel ... 477

DuPont de Nemours & Company, Inc., E. I. ... 465

Feehheimer Brothers Company, The ... 479

Herbst Brothers ... 471

Ingersoll Steel and Disc Company ... 463

Keene Forestry Associates ... 471

Knapp Company, Fred C. ... 475

Loring, J. Alden ... 475

Mears, A. H. G. ... 475

Pacific Marine Supply Company ... 469

Randolph, L. F. ... 475

Remington Arms Company, Inc. ... 469

Smith & Company, D. B. ... 473

Stetson Company, John B. ... 467

Stockwell, Ltd. ... 477

Terrell's ... 477

Warren Axe and Tool Company ... 475

Western Maine Forest Nursery 471

Wood Industries, Inc., Gar 4th Cover

Elsewhere low rock dams were built across shallow valleys where stream ways were checked, obviously to spread the waters behind terrace walls. While these are not now in a state of repair, the works still serve to render better conditions for Arab barley culture than would the natural, untreated valley.

These are a few instances of a vast amount of works showing an amazing understanding and knowledge of the principles and detail of control and use of storm waters during Roman times in North Africa. A survey of such works has been made by the French Government in accord with its policy to protect and use such ruins as indicators of possible agricultural development of Algeria and Tunisia.

Whatever the economic, political, or social forces which brought about these works, we are sure that under Roman rule in North Africa measures for the control and use of little waters had been carried to an amazing degree of refinement and to a surprisingly wide extent even unto the margin of the desert. These works served to supply water through masonry aqueducts, supported by manifold arches, to numerous cities; through check dams to retard and divert storm waters for supplemental irrigation of terraced lands; through cisterns of a wide variety of design and location for municipal use and for water for extensive stock raising in the Steppe plateau and along the margin of the desert.

All this refinement in the control and use of water, which at the same time provided for the control of water and wind erosion of the soil, was wiped out with the destruction of Roman civilization, first by the Vandals and finally and completely by the Arabs. Not only was Roman civilization destroyed, but so was Roman agriculture, and, more important, the traditions of agriculture. All advances in the munitiae of water control were lost in the destructive occupation of the nomad. Herds of sheep, camels and, most destructive of all, the black goat of Africa, have changed the entire face of the landscape by stripping the land of vegetation. Storm waters sweep off a naked landscape, carrying away the soil. Charged "oueds" or "wadies" and slopes are year after year furrowed deeper and deeper, rendering the land less and less capable of absorbing the waters.

Nowhere are lands more in need of rain; and nowhere has there been such destruction of the means developed by a thoughtful people to conserve the scanty supplies of rain water. Roman rule seems to have been intelligent in the conservation of little waters, but since its destruction the land has lain under the blight of the goat. For the past fifty years, however, the French Government has been developing and carrying out a program of restoration of an agriculture equal to the capacity of the land as it has survived the wastage of past abuse. And archaeology has been and is the handmaid of this important program of land reconstruction.

WHO'S WHO

Among the Authors in This Issue

CHARLES ROBERT ROSS (*Wilderness Resurgent*) is a junior forester with the federal Forest Service and is stationed on the Chattahoochee National Forest. Mr. Ross says that he dislikes but one thing—to see so many people ride through the Southern Appalachian mountains and fail to appreciate, because of their impoverished condition, the inestimable possibilities inherent in the mountain people.

ALLAN F. MATTHEWS (*Primitive Forests—Their Geologic Record*), who has worked in Colorado exploring for minerals and assaying gold, an Antioch College man, will study for a doctorate in geology at Johns Hopkins University next Fall.

ALFRED M. BAILEY and ROBERT J. NIEDRACH (*Filming the Golden Eagle*) are noted for their scientific work in biology and for their photography of wildlife. Mr. Bailey is now Director of the Colorado Museum of Natural History at Denver, and Mr. Niedrach is Curator of Birds at the Colorado Museum at Denver.

L. J. PESSIN (*Tree Dwellers*) is engaged in silvical research at the Southern Forest Experiment Station. Dr. Pessin's acquaintance with epiphytes dates back to 1919 when he spent several months in Jamaica studying epiphytes on trees and leaves.

L. J. Pessin

NEWELL L. WRIGHT (*From Logger to Son*), who has been an assistant forest ranger, in private work as a logging engineer and logging superintendent, is at present a logging engineer with the federal Forest Service.

W. C. LOWDERMILK (*Control of Little Waters in North Africa*), presenting here the third of his articles on the part soil destruction played 6,000 years ago in the crumbling of the Roman Empire, is Chief of Research of the Soil Conservation Service.

R. MACLAGLAN GORRIE (*Ties for the Rails of India*) received his D.Sc. in forestry at Edinburgh. Since 1922 he has been in Punjab, India, where he has made a forest working plan for the Mandi State, an area with valuable deodar forests and interesting grazing problems in the Punjab Himalayas.

THE COVER—Canada's lovely Lake Maligne, in Jasper National Park. Photograph by John Kabel.

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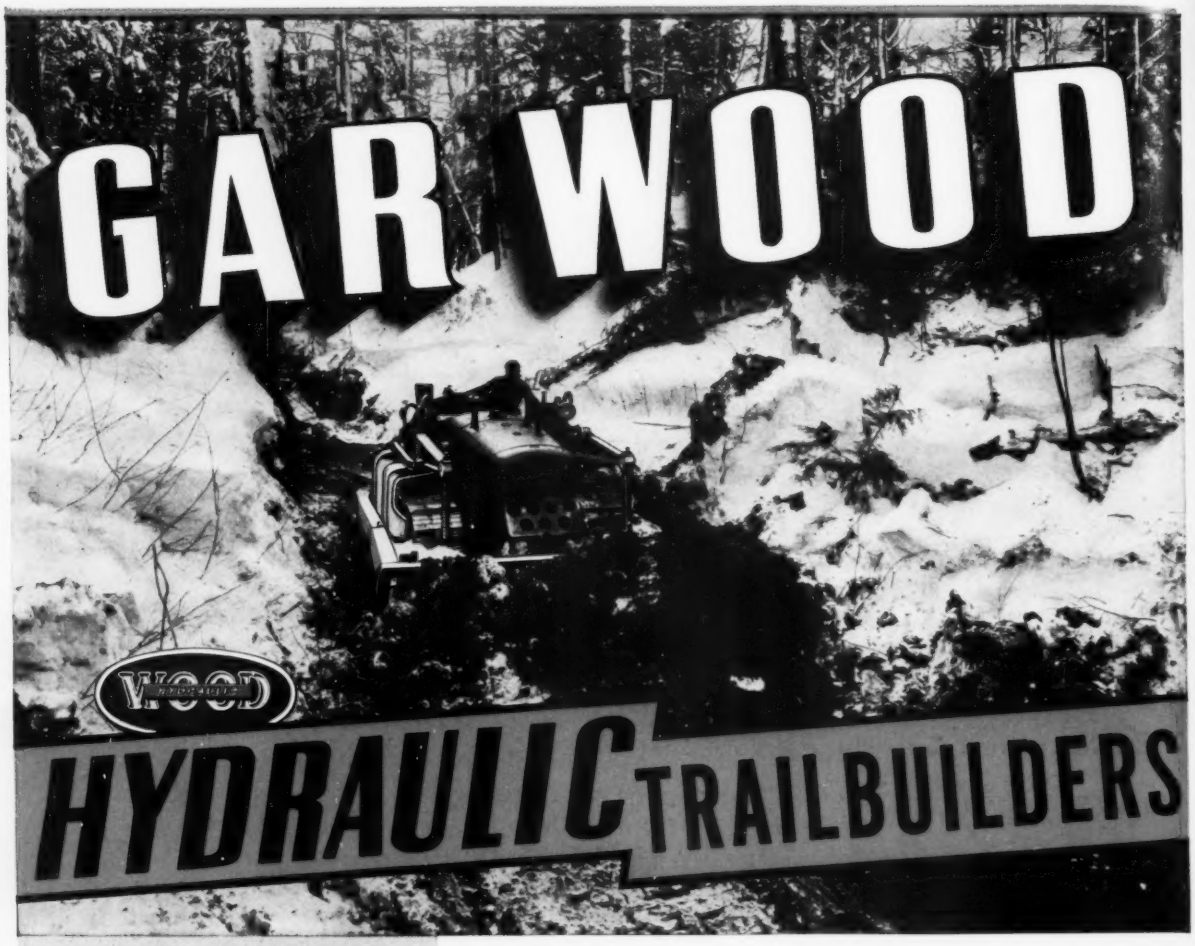

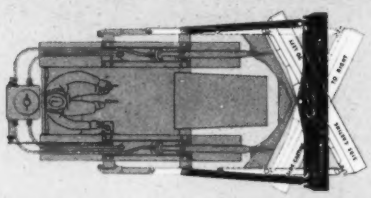

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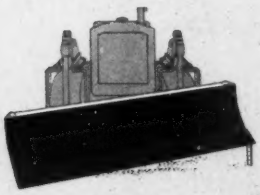

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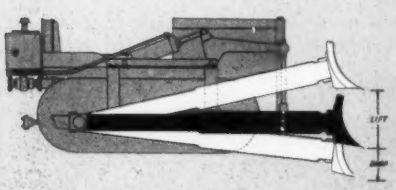

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